

Nomination for Heritage Recognition

Werribee Satellite Aerodrome Hangars

by Alan Hankins and Thanh Ho



May 2014

Cover Image

Hangar No.1, Werribee Satellite Aerodrome

Two out of an original five hangars constructed using timber roof trusses during World War II remain on the site of the Werribee Satellite Aerodrome south west of Melbourne.

These hangars are of similar design but represent two sizes – Hangar 1 (as illustrated) has a span of 130 feet (40 metres) whilst the smaller Hangar 2 has a span of 96 feet (29 metres).

Hangar 2 currently houses the B-24 Liberator Memorial Restoration Australia Inc project which has seen the restoration of an RAAF Liberator heavy bomber A72-176 in recent years.

Source: Owen Peake

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Heritage Award Nomination Letter

The Administrator
Engineering Heritage Australia
Engineers Australia
Engineering House
11 National Circuit
BARTON ACT 2600

Name of Work: Werribee Satellite Aerodrome Hangars

The work mentioned above is to nominate for recognition under the terms of the Engineering Heritage Recognition Program.

Location: Southern corner of Princes Highway & Farm Road; Werribee, Wyndham City, Victoria, Australia, approximately 33km from Melbourne CBD. Refer Appendix 2 for maps of the location.

Longitudes and latitudes are:

Hangar No.1: 37°54'42.13" S 144°38'34.69" E

Hangar No.2: 37°54'28.79" S 144°38'44.74" E

Owner (Name & Address): Actual Owners of the Aerodrome is Melbourne Water who had used the hangars as storage in the past but one of the hangars is used currently by the B-24 Liberator Memorial Restoration Australia Inc.

The owner has been advised of this nomination and a letter of agreement is attached. Refer to Appendix 8.

Access to Site: The site is a museum and is open to the public at advertised times. These are usually Tuesdays, Thursdays and Sundays between the hours of 9:30am and 3:30pm.

Nominating Body: Engineering Heritage Victoria

OWEN PEAKE

Chair, Engineering Heritage Victoria

Date: 21 May 2014

1.0 Introduction

In the preparation of the nomination of the Werribee Satellite Aerodrome Hangars, a considerable amount of discussion was carried out in order to determine the boundaries of the nomination to be produced. The boundaries of the nomination include the fact that the hangars contributed to the history of Australia. The technical innovation and history of the hangars provide the site with engineering heritage significance.

In 1942, during the Pacific War, the Japanese had a heavy presence in South-East Asia and had plans to occupy Port Moresby, which is located in Papua New Guinea and would have allowed the Japanese the ability to attack the northern sections of Australia. This led the Royal Australian Air Force (RAAF) to prepare by constructing many armaments, including aircraft and hangars for aircraft. This site served as a satellite for the Point Cook and Laverton RAAF airfields. The Werribee Satellite Aerodrome consisted of five hangars, a workshop area and accommodation and administration buildings. The only surviving buildings today are two hangars, with one hangar being closed to the public due to safety concerns.

The hangars were based on an American design but the design was modified to incorporate materials that are available in Australia. This incorporation of Australian materials in the design of these hangars allowed for longer spans in the hangars, including 130 foot span and 96 foot span versions. The original designs incorporated softwood, whereas the Australian modified designs used local hardwood, which was available in abundance. The designs also incorporated the use of sheer plate connectors, which had originated in the American design. These connectors were instrumental in the development of the longer spanned hangars.

There was a shortage of steel at the time so that the use of timber for the structures was preferred. This design was effective and was used in several locations in Australia. The design was first used at the United States Army Air Force base at Tocumwal in New South Wales.

The remaining hangars have engineering heritage significance. They are the last hangars of this design remaining in Victoria ¹, with the 96 foot spanned hangar being the only one left in Australia ².

Hangar No.2 is currently used by B-24 Liberator Memorial Restorations Australia Inc., which is a group dedicated to the restoration of a B-24 Liberator aircraft, with the RAAF serial number A72-176. Hangar No.1 is currently not in use as it is considered too dangerous from a structural perspective.

¹ "Research on similar structures built in Australia has revealed the hangars at Werribee to be the only examples of their type (using trussed timber construction) in Victoria" Quote taken from; Conservation Management Plan of Hangar 1.

² "No other 96 foot (29.3 metre) span hangars are known to survive elsewhere in Australia" Quote taken from; "Werribee Satellite Aerodrome", http://vhd.heritage.vic.gov.au/vhd/heritagevic#detail_places;71889.

2.0 Heritage Assessment

2.1 Basic Data

2.1.1 Item Name

Werribee Satellite Aerodrome Hangars

2.1.2 Other/ Former Names:

Nil

2.1.3 Location

The Aerodrome is located at the corner of Princes Highway and Farm Road, Werribee, Wyndham City, Victoria, Australia. Refer to Appendix 2 for map showing location.

The longitude and latitude of the Aerodrome is as follows; Latitude: 37°54'28.66" S and Longitude: 144°38'44.39" E. The Aerodrome is located around 1.7 km from the central community hub of Werribee. A map of the location was been included in the Map section of this nomination.

2.1.4 Addresses

Melbourne Water Corporation
990 La Trobe Street
DOCKLANDS VIC 3008

B-24 Liberator Memorial Restoration Australia Inc.
PO Box 156
WERRIBEE VIC 3030

2.1.5 Suburb/ Nearest Town

Werribee and Werribee South

2.1.6 State

Victoria

2.1.7 Local Government Area

Wyndham City Council.

2.1.8 Owner

The Werribee Satellite Aerodrome is currently owned by Melbourne Water and Hangar No.2 is currently used by the B-24 Liberator Memorial Restoration Australia Inc. The land that the hangars sit on was first obtained from the Melbourne and Metropolitan Board of Works (MMBW) which used the land as a Sewage Farm. Some of the MMBW land was acquired "for aerodrome purposes"³. The Werribee Satellite Aerodrome was built on the site. This was a training airfield to the nearby Point Cook and Laverton air bases. The negotiations were undertaken during June 1939 and were later confirmed in February of 1940.

³ "In June 1939 the Federal Government began negotiations with the then MMBW Sewage Farm to acquire a 340-acre portion of the farm for the RAAF "for aerodrome purposes." Quote taken from; Conservation Management Plan of Hangar 1

2.1.9 Current Use

Most of the buildings of the previous aerodrome have been demolished. One 130 foot span (Hangar No.1) and one 96 foot span (Hangar No.2) hangars remain plus a workshop building.

The 96 foot span hangar is used by B-24 Liberator Memorial Restoration Australia Inc. This Society is a group of individuals with the common goal of restoring a B-24 Liberator aircraft, which was a heavy bomber aircraft used in the Second World War. The 130 foot span hangar is no longer used due to its structural condition.

2.1.10 Former Use

The site was used during the Second World War as a Satellite Aerodrome used for pilot training. The Aerodrome had five hangars, a workshop and other buildings which were operational during the Second World War.

2.1.11 Designer

The original designers of these type of hangars were American engineers. During times of war steel was in short supply. This led to the development of structures that used minimal metal in their construction. At the time, a large span hangar was required to house large aircraft. The use of timber was therefore adopted to cut down significantly on the amount of steel incorporated.

In Australia, Allied Works Council engineers redesigned the hangars to utilise Australian hardwoods instead of American softwoods. The Australian hardwoods are much stronger and at that time were readily available.

2.1.12 Marker/ Builder

The hangars were constructed as a joint RAAF/USAAF ⁴ project and were constructed to house elements of both forces. The government body which was in charge of construction of government property was the Civil Construction Corp (CCC).

The CCC was established in April of 1942 and was charged with the construction of airfields, gun emplacements, barracks and other projects for the Allied Works Council. During this period of time, men between the ages of eighteen and sixty were conscripted into the CCC, unless they were serving within the armed service or in the army reserves. Thousands of workers served in the CCC, with 77,500 workers at the end of the Second World War ⁵.

2.1.13 Year Started

The 340 acre land was acquired from the owners, which was the Melbourne and Metropolitan Board of Works, in 1939 and was finally obtained by the government in 1940. In anticipation of the Pacific War and by request of Australia Prime Minister, John Curtin, for aid, America increased its military presence in Australia ⁶. To facilitate this increase in activity, 70 acres of this land was used for the construction of aircraft hangars.

⁴ United States Army Air Force

⁵ "By the end of the war 77,500 men had served in the CCC" Quote taken from; "Australian under Attack 1942 – 1943, Civil Constructional Corps" <<https://www.awm.gov.au/exhibitions/underattack/mobilise/civil.asp>>

⁶ "The Australian Prime Minister John Curtin then called on America for help... America responded, and from early 1942, thousands of American troops began arriving in Australia" Taken from; "Americans in Australia" <<http://ergo.slv.vic.gov.au/explore-history/australia-wwii/home-wii/americans-australia>>

2.1.14 Year Completed

The Aerodrome was used to house American and Australian forces and hence was not completed till after the Americans joined the Second World War in 1941, after the Pearl Harbour attack occurred ⁷. The Aerodrome was actually fully completed in the period 1942-1943.

2.1.15 Physical Description

The Aerodrome consisted of five hangars, one 130 foot span hangar and four 96 foot span hangars, and a workshop. The remaining buildings now consist of two hangars, Hangar No.1 having a span of 130 feet, and Hangar No.2 having a span of 96 feet, and a workshop.

The two remaining hangars have a length of roughly 147 feet (Hangar 1) and 109 feet (Hangar 2). Both were constructed using an American design.

Due to the unsafe nature of the workshop, we were not allowed to enter the workshop or go anywhere near the structure, hence we were not able to closely analyse the structure and we can only speculate about the structure. From looking at the outside of the structure, we could see that the structure did not have the same design as the hangars. This is probably due to the fact that the workshop did not require a large span.

2.1.16 Physical Condition

The Hangars seem to be both in rather poor condition.

Hangar 1 could not be inspected due to safety concerns.

Hangar 2 needed major modification to be considered safe for use for the Liberator restoration project. This consists primarily of steel column supports (props) under the wooden trusses at various points.

When we closely examined Hangar 2 it showed signs of termite damage. The damage was mainly noticeable in the main column bracing of the hangar. The following image is that of the damage that we are assuming to be due to termites.

⁷ "America's isolation from war ended on December 7, 1941, when Japan staged a surprise attack on American military installations in the Pacific" Taken from; "America Goes To War"
<<http://www.nationalww2museum.org/learn/education/for-students/ww2-history/america-goes-to-war.html>>



*Figure 1: Termite damage present in the Column Bracing of Hangar 2⁸.
Source: Alan Hankins*

⁸ It is not clear to some observers if this damage is termite attack or timber rot.

The following are images of the individual buildings present at Werribee Aerodrome.



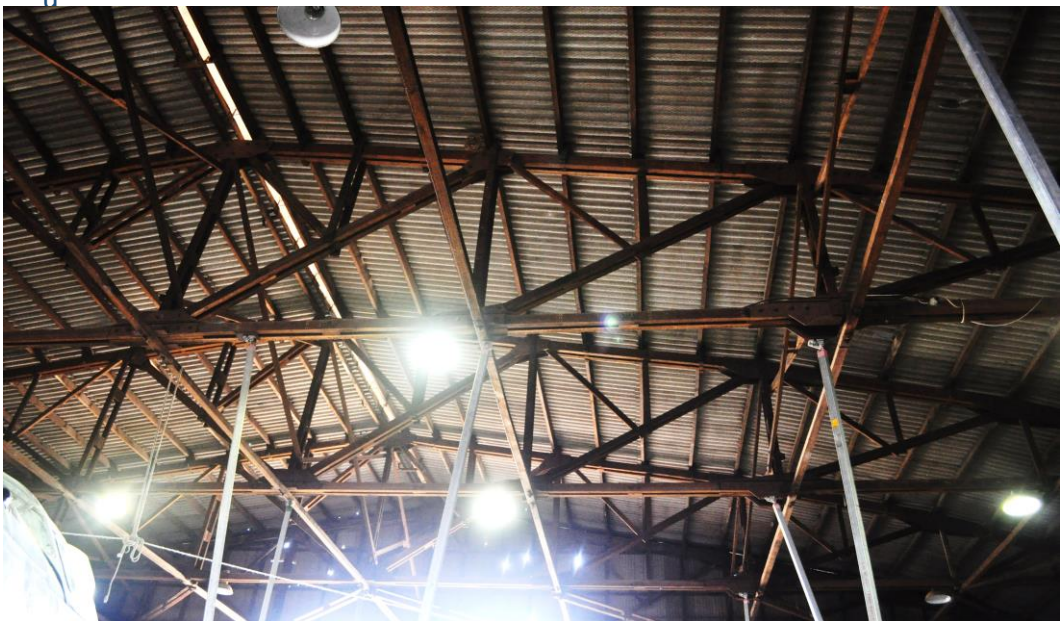
Figure 2: Hangar 1 (130 foot span)
Source: Owen Peake



Figure 3: The workshop
Source: Owen Peake



F
Figure 4: Hangar 2 (96 foot span)
Source: Owen Peake



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U
O
Figure 5: Interior of Hangar 2 with vertical steel supports.
Source: Owen Peake

2.1.17 Modifications and Dates

The hangar used by the B-24 restoration group has been reinforced by steel columns installed by the group to reinforce the roof trusses. These columns consist of square hollow sectioned steel (100mm x 100mm) components with pin joints at the top and bottom of the columns. The following is an image of one of the columns used in the modification of the hangar.



Figure 6: Square RHS Column modification of Hangar 2

Source: Owen Peake

2.1.18 Historical Notes

The hangars signify a relationship developed by between the USAAF and the RAAF. The hangars were a collaboration between the two governments, showing an integration of American design into an Australian Project. Many events led to the creation of these hangars, which shows the value of these hangars to the history of Australia and its part in the Second World War.

In 1941, the Japanese launched an attack on Pearl Harbour, which led to the death of around 2400 US military personnel and around 70 civilians. This act led to the United States declaring war on Japan and participating in the Second World War. Within the next 24 hours, the Japanese commenced an offensive through South-East Asia, with landings within Malay and Thailand. Within the next few weeks, the Japanese invaded the Netherlands East Indies and started to bomb Darwin on 19 February 1942. Australia sought assistance from the United States. The Prime minister at the time; John Curtin, stated “Without any inhibitions of any kind I make it quite clear that Australia looks to America, free of any pangs as to our traditional links or kinship with the United Kingdom”⁹. These words marked the beginning of the long alliance which flourished between Australia and the United States and which continues to this day. This alliance led to the United States delivering massive military aid to Australia. It also led to large numbers of American servicemen being based in Australia¹⁰.

The design of the hangars was originally created by the United States Army Air Force (USAAF). The USAAF was then the air force arm of the American military. The USAAF had a major presence in Australia after the Japanese had occupied the Philippines, which forced the USAAF to retreat further south, relocating to bases in the Netherlands East Indies, then in Australia. After America gained a bigger influence in Australia, this led to the re-enforcement and reorganization of the USAAF. To

⁹ Quote taken from; “Australia’s place on the world stage”;
<<http://john.curtin.edu.au/ww2leaders/world.html>>

¹⁰ Information on the subject can be found; “Crisis at Home and Abroad”,
<<http://john.curtin.edu.au/manofpeace/crisis.html>>

house the reinforcements for the USAAF within Australia, new American bases were needed. This led to a re-staffing of USAAF units within this area, leading to the rise of George Kenney. George Kenney was one of the well accomplished officers that the USAAF based in Australia. He was a decorated general within the USAAF at the time, awarded a Silver Star ¹¹ and a Distinguished Service Cross ¹². These were awarded to him during his time as a Major General of the Fifth Air Force of the USAAF, which was based in Brisbane.

No direct link between General Kenney and the adoption of the American designed hangars at Tocumwal, Werribee and other locations has been made.

A majority of the structures to house the American personnel were constructed by the Civil Construction Corp (CCC). Within this period of time, The Allied Work Council (AWC), was responsible for carrying out work required for the war was facing a problem, which was the lack of labour available to them. AWC was headed by Edward Theodore, Director General from February 1942 to October 1944. By the approval of the War Cabinet of Australia, the CCC was created. The CCC was a civilian organisation comprised of volunteers and conscripts. Since this was a period of war, the CCC had a more rigid disciplined work ethic than normal industry, where workers were not allowed to refuse work and were subjected to military type of discipline within the work place. The members of CCC worked on many different types of structures, which included aerodromes, docks, roads, gun emplacements, pipelines, fuel storage depots and other types of facilities needed in times of war. One of the many projects constructed by the CCC was the hangars at Werribee Satellite Aerodrome. The CCC and its related companies were disbanded after the Second World War. Restoring these hangars would acknowledge the service that civilians contributed to the war effort in Australia.

The American presence in Australia in this period led to many influences on Australia, both positive and negative. During the duration of the Second World War, around 1 million American service personnel passed through Australia ¹³. This influx of Americans had an effect on Australian's culture, economy and lifestyle. The Americans at first were welcomed as the saviours of Australia, for being our allies in our time of need, but the glamour of their presence wore off over time. This was mainly due to the fact that the Americans were paid more, had access to exotic customer items in their tax-free stores, and even to the point that Australian women were more attracted to American men due to them being better paid, with many of women moving to America after the war. This led to tension between the Australians and Americans. Nevertheless, the Australian-American alliance was welcomed, and is still important till this day ¹⁴. These hangars are a representation of the relationship that Australia and America had in the Second World War and also demonstrates the high level of cooperation between the two countries.

¹¹ Awarded for Acts of heroism performed with marked distinction; "The Silver Star, Heroism Performed with Distinction" <<http://usmilitary.about.com/od/medalsanddecs/a/silverstar.htm>>

¹² Awarded for distinguished command and leadership in action; "It's an Honour, Australia Celebrating Australians" <http://www.itsanhonour.gov.au/honours/awards/medals/distinguished_service_cross.cfm>

¹³ Taken from; "All in – 'over-sexed, over-paid and over here'", <<http://www.ww2australia.gov.au/allin/yanksdownunder.html>>

¹⁴ Information on the subject can be found; <<http://www.ww2australia.gov.au/allin/yanksdownunder.html>>

2.1.19 Heritage Listings

1 Name: Werribee Satellite Aerodrome

Location: Cnr. Princes Highway & Farm Road, Werribee, Wyndham City

Victorian Heritage Register (VHR) Number: H1884

Level of Significance: Registered

Listing Date: 2nd of November, 2013¹⁵ ¹⁶

2 Name: Werribee Satellite Aerodrome

Location: Cnr. Princes Highway & Farm Road, Werribee, Wyndham City

Heritage Overlay Number: HO7, Wyndham City Council

¹⁵ Allocated publish date of the Heritage Listing on the Heritage Victoria Homepage;
<<http://vhd.heritage.vic.gov.au/#search:simple:user:list:database%7Cplaces:Wyndham:1>>

¹⁶ See full text of Heritage Victoria listing at Appendix 7.

2.2 Assessment of Significance

2.2.1 Historical Significance

See Historical Notes above.

2.2.2 Historic Individuals or Association

RAAF, USAAF, Allied Works Council and the Civil Construction Corp. are discussed in section 2.1.18.

TECO (manufacturer of the TECO Shear Plate fastener) is detailed at Appendix 5

Key figures associated with the story of the hangars have been identified:

- Edward Theodore, Allied Works Council, Director General, February 1942 to October 1944
- General George C Kenney, United States Army Air Forces

See biographical notes at Appendix 6.

2.2.3 Creative or Technical Achievement

During the Second World War, due to the need of steel for weaponry, steel was rationed for use in most countries to help the war effort. This led to a rationing of many everyday items, which included, but was not limited to; can openers, kitchen utensils, canned goods, and paper clips. Due to the need for steel to help the war effort, this forced American engineers to limit the use of metal within their designs, which included these hangars. The hangar designs allowed for the minimal use of steel within their design, but still had the structural integrity to allow for the large spans that were required. This showed innovation of engineers at the time and hence allowed for the design to be commonly used during the period.

Later hangars were more likely to be constructed with steel roof trusses.

The use of the TECO shear plate fastener in Australia may have been initiated by the adoption of this method in the hangars covered by this nomination. However it has not been proven that the use of the connectors in these hangars was the first use of the product in Australia. Certainly, following World War II, the use of the various TECO products, including the shear plate fasteners and later the Trip-L-Grip style sheet metal connectors had a major influence on timber building fabrication in Australia.

2.2.4 Research Potential

We are able to research how the cooperation between two countries helped develop new forms of technology.

During 1942, Australia was under threat of invasion from the Japanese and sought aid from the Americans, which led to an alliance between the two countries. As Australia became a base of operations for the American war against the Japanese in the Pacific War, the Americans developed many military bases in Australia. This led to an integration of American design into the country, which influenced Australian technology.

The hangars are a result of amalgamation of American and Australian technology. The design of the hangars were originally designed by the American military, but were modified by Australian

engineers. This modification of the design was through the use of Australian hardwood timber within the trusses of the hangars, where the original designs incorporated the use of American softwood. This modification allowed for larger spanned hangars.

Further research is required to positively confirm which type of TECO fastener was used in the hangars. It is likely that different types were used in different circumstances however the drawings do not detail this use. There is reference to the Split Ring type of fastener although most references quote the Shear Plate type. Both operate on similar principles and both were manufactured by TECO at the time of construction of the hangars. The connectors are completely hidden within the structure of the trusses when assembled. The only way to positively confirm the type used is to disassemble a truss and visually identify the type of connectors used. This remains an outstanding task for researchers.

This nomination sets out to identify all hangars of this type erected in Australia and to identify the survivors amongst this group. This has not proved possible on an Australia-wide basis although data for Victoria has been obtained. Completion of the history of this type of hangar in Australia therefore remains an outstanding research task.

2.2.5 Social

This Aerodrome was used as a training facility for RAAF and USAAF crews. Training apparently concentrated on bombing and night flying exercises and formed part of the Empire Air Training Scheme ¹⁷.

Air crew of all nations partied hard both during training and operational deployments. There would have been substantial social interaction between the air crew based at the Aerodrome with local communities.

2.2.6 Rarity

Around Australia there were about 21 of this type of hangar constructed ¹⁸. Some of the locations where this type of hangar were built include; Charleville and Townsville in Queensland, Maryland in Western Australia and Tocumwal in New South Wales as well as at Werribee in Victoria.

The five hangars built at Werribee were the only hangars of this American origin built in Victoria and were “unique in Victoria being the only examples of a type of timber truss design originating in the United States” ¹⁹. Werribee was also unique in that it was the only American air base built in Victoria, and it has been proposed as a location for an ‘American Memorial’, to commemorate American Servicemen ²⁰.

The hangars are relatively rare; being the only hangars constructed using this type of design in Victoria.

¹⁷ Information Provided from; <http://vhd.heritage.vic.gov.au/vhd/heritagevic#detail_places;71889>

¹⁸ “It is thought that approximately 21 of the hangars...were erected in Australia”, taken from; <<http://www.wyndhamhistory.net.au/items/show/1046>>

¹⁹ Quote from; <http://vhd.heritage.vic.gov.au/vhd/heritagevic#detail_places;71889>

²⁰ Information Provided from; <http://vhd.heritage.vic.gov.au/vhd/heritagevic#detail_places;71889>

2.2.7 Representativeness

In functional terms the Werribee hangars are typical of aircraft hangars used prior to and following their construction during World War II however, for their time, they were large examples.

The relevant engineering input into the design of these hangars between US and Australian engineers remains unclear. This clouds the representativeness of these structures in both the United States and in Australia.

2.2.8 Integrity/ Intactness

Considering the age and method of construction of these hangars, they are in reasonable condition, with Hangar 2 still in use ²¹.

Hangar 1 could be restored to use if a suitable reuse could be found for it.

²¹ "They... are in reasonable condition considering their age and method of construction", Taken from <http://vhd.heritage.vic.gov.au/vhd/heritagevic/?timeout=yes#detail_places;125305>

3.0 Statement of Significance

The following Statement of Significance was taken from the Victorian Heritage Database on the Heritage Victoria website, VHR Number H1884.

What is significant?

The Werribee Satellite Aerodrome was constructed in 1942 on land leased from the Melbourne Metropolitan Board of Works in 1940. It served throughout the Second World War as a satellite to the nearby Point Cook and Laverton RAAF airfields. The aerodrome consisted of five timber trussed hangars, a workshop building and an area of accommodation and administration buildings. The airfield was grass with no formed runways. In 1952 the land, including the buildings was returned to the MMBW. Only the hangars and workshop building remain. The hangars are unique in Victoria being the only examples of a type of timber truss design originating in the United States and using steel shear connectors to produce clear spans of 130 feet (130 feet) and 96 feet (96 feet). The design, produced by the Allied Works Council and adapted to use unseasoned Australian hardwoods, was first employed at the much larger United States Army Air Force base at Tocumwal NSW. At Werribee only one of the five hangars was of the larger 130 feet span. Timber was used for these buildings because of the shortage of other building materials and because the type was well understood by American engineers on the Allied Works Council. After 1942 this method of construction of aircraft hangars was abandoned in Victoria in favour of the prefabricated steel Bellman type hangars of which scores remain throughout the State. The Werribee buildings are clad in corrugated iron and asbestos cement, have concrete floors and aprons, and full height sliding doors. They have been used since the 1950s as storage by Melbourne Water and are in reasonable condition considering their age and method of construction.

How is it significant?

The Werribee Satellite Aerodrome is historically and architecturally significant to the State of Victoria.

Why is it significant?

The Werribee Satellite Aerodrome is of historical significance as an example of the many temporary airfields that were constructed across Australia in the early years of the Second World War, particularly after the entry of the Japanese into the war.

The aircraft hangars at the Werribee Satellite Aerodrome are architecturally significant as unique examples of their type in Victoria. The trusses which provide the large clear span required for aircraft are unusual for being fabricated from relatively short lengths of (initially) unseasoned Australian hardwood joined by patented TECO steel shear connector plates. This technology of expediency, especially in the case of Hangar 1, produced the largest clear span timber trussed building seen in Victoria. Later hangars such as at Tottenham RAAF Stores Depot utilised nailed arches to achieve a similar span.

4.0 Area of Significance

State

5.0 Interpretation Plan

5.1 General Approach

The strategy for interpretation of the Engineering Heritage Works is laid out in the latest version of the EHA's "Guide to the engineering Heritage Recognition Program"²². The interpretation will be by marking the works with an appropriate level of heritage marker; a public ceremony to unveil that marker and an interpretation panel which summarises the heritage and significant features of the works for the public.

This plan provides a summary of the proposals for design, content, location, manufacture and funding of the proposed interpretation.

5.1.1 Date of Event

The date of the event of recognition of the interpretation panel should correspond to the date for the ceremony of the Interpretation panel of the B-24 Liberator, due to both of the ceremonies sharing the same space and also the importance. The current date set is **Sunday 13 July 2014**.

5.1.2 The Interpretation Panel

The following is a list of criteria that should be incorporated into the Interpretation panel content:

- 1.0 A title; "Werribee Satellite Aerodrome Hangars"
- 2.0 A subtitle; " Site of largest clear span timber trussed building in Victoria"
- 3.0 Logos of stakeholders; Engineers Australia, B-24 Liberator Memorial Restoration Australia Inc., Melbourne Water
- 4.0 Representation of the EHA marker plate
- 5.0 Details of ceremony; including Date, Location, etc.
- 6.0 Website details and a QR code to access the full heritage nomination
- 7.0 Text of the main body should be a at least 30 point Arial Bold
- 8.0 Minimum text size to be used should be 24 point Arial Bold
- 9.0 Photographs should be used to illustrate the panel, each with a caption and attribution.

The interpretation panel structure will have the following technical specifics:

- 1.0 Size to be nominally 1200mm wide by 600mm high
- 2.0 The panel to be constructed of a vinyl reflective film-on-steel plate with flanges as per the drawing at Appendix 7
- 3.0 Panel is to be mounted on a steel free-standing frame as shown in Appendix 7
- 4.0 The EHA marker to be mounted below the interpretation panel as shown in Appendix 7

Location of the interpretation needs to be discussed with the B-24 Liberator Memorial Restoration Australia Inc., but would most likely be located so that it can be viewed before entering Hangar 2. This is most likely between the hangar and the Geelong Road frontage.

5.1.3 Design Process of Panel Content

The nomination of the Aerodrome would be reviewed during its development by the following parties:

²² The 2012 Version - Guide to the engineering Heritage Recognition Program

- The members of the Victorian Engineering Heritage committee
- The B-24 Liberator Restoration Australia Inc committee
- Melbourne Water

The initial design and concept of the interpretation panel will be developed at the writing stage of the nomination. The initial design will then be submitted to the Heritage Recognition Committee.

Manufacturing will be carried out by Glassmetal Industries, Geelong.

5.1.4 Funding for Interpretation Panel

Item	Fund Source	Amount
Graphic Design & Photographic Rights	EHA National Budget	\$500
Manufacturing of Interpretation Panel	Advanced Group, Melbourne. Funding by EHV.	\$1500
Manufacturing of Frame	To be carried out by B-24 Liberator Memorial Restoration Australia. In kind.	
Installation of Interpretation Panel & Frame	To be carried out by B-24 Liberator Memorial Restoration Australia/EHV. In kind.	
Supply of EHA markers	EHA National Budget	\$300
	Total	\$2300

Table 1: Predicted Cost of Interpretation Panel

5.2 Possible Interpretation Themes for Interpretation Panel

The interpretation panel could have the following topics:

- 1.0 History of the Werribee Satellite Aerodrome and its Hangars
- 2.0 Design of the Hangars
 - 2.1 Could target the use of American design in Australia and how we improved upon them
 - 2.2 May target how the Americans respected the Australians enough to share knowledge of their hangars and also how the relation developed to how it is today.
- 3.0 Individual and Organisations Associated with the Project
 - 3.1 Different Organisations and how they interact with each other within the project

5.3 Preliminary Design of Interpretation Panel

The following is a preliminary design of the Interpretation panel that targets the history of the Werribee Satellite Aerodrome Hangars:

Werribee Satellite Aerodrome Hangars

Largest clear span timber trussed building in Victoria

The Pacific War, 1942

The United States of America entered the Second World War following the bombing of Pearl Harbour (Hawaii) by the Japanese in 1941. Australia then became a base for Allied forces in the Pacific War.

Need to establish joint facilities in Australia for US and Australia ...

Satellite Aerodromes

Parent field and satellite ... Werribee was a satellite aerodrome to Point Cook and Laverton ... It had no formal runways, just grassed landing strips ...

There were five hangars, a workshop, and accommodation and administration buildings. Only two hangars and the workshop remain.

Engineering Heritage Marker July 2014
Bulleen, Australia

Design Adoption

To accommodate aircraft – such as the B-24 – with large wingspans, hangars had to provide a very wide unobstructed space. A roof design known as a truss is able to span large distances. It consists of a series of triangular units connected at joints.

American engineers designed the truss for their own airfields. The use of Australian hardwoods enabled greater distances to be spanned.

The TECO Shear Truss Connector

These joints are critical points. They must be strong enough to carry the load of the truss itself and the roof its supports. Over-tightening a conventional bolt can damage the timber and weaken the joint. The TECO connector has a special joint used as an addition in the timber – it spreads the load, strengthens the joint, and reduces the number of bolts needed. This American filling and Australian hardwood was the key to building the large span hangars needed by the Allies.

Hanger 1 and the workshop are no longer able to stand. Hanger 2 now has additional roof supports and because the restoration of the B-24 Liberator Long Range Bomber.

TECO, The Timber Engineering Company, was incorporated in Chicago in 1939.

Owned by the American timber industry, its purpose was to research and develop designs for wood structures using patented timber connections.

Today's timber houses feature a legacy of TECO's engineering.

Edward Theodore
Director-General of the Allied Works Council recommended the formation of the Civilian Construction Corps ...

General George Henry, DFC, USAAF
FBI Air Force based in Brisbane ...

Chief Construction Corps Badge

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7.0 Nomination Team Members

Thanh Ho

Course Details – Bachelor of Engineering (Civil)

Contact Details – thanhhuong.ho@live.vu.edu.au

Age - 21

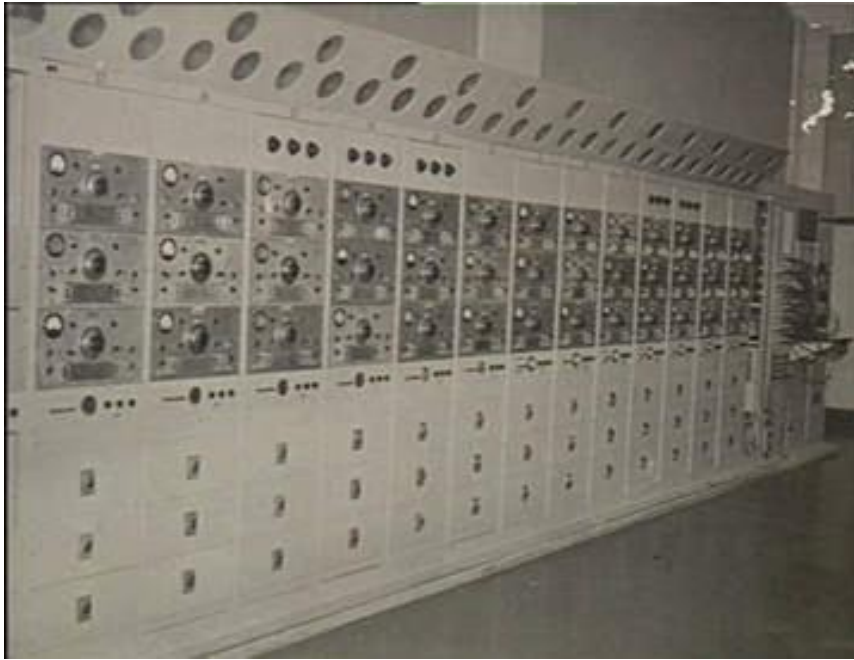
Alan Hankins

Course Details – Bachelor of Engineering (Civil)

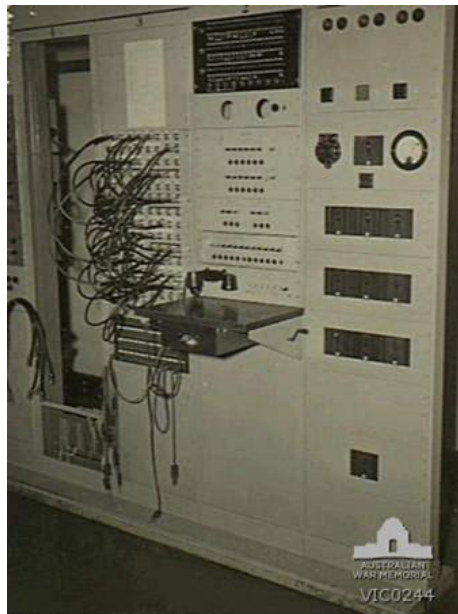
Contact Details – alan.hankins@live.vu.edu.au

Age - 22

APPENDIX 1: Images and Captions



*Figure 7: The Receiving Room at Werribee Aerodrome, showing 52AR7 receivers²³.
Source: Royal Australian Air force Museum*



*Figure 8: The Antenna Switching Panel at Werribee Aerodrome²⁴.
Source: Australian War Memorial VIC0244.*

²³ It is not known in which building or where on the site this equipment was housed. The equipment no longer remains on the site.

²⁴ Ibid.



*Figure 9: Details of Roof Truss Connections using steel splice plates and TECO Sheer Plates.
Image: Owen Peake.*



*Figure 10: Details of Roof Truss Connections using steel splice plates and TECO Sheer Plates.
Image: Owen Peake.*

APPENDIX 2: Maps

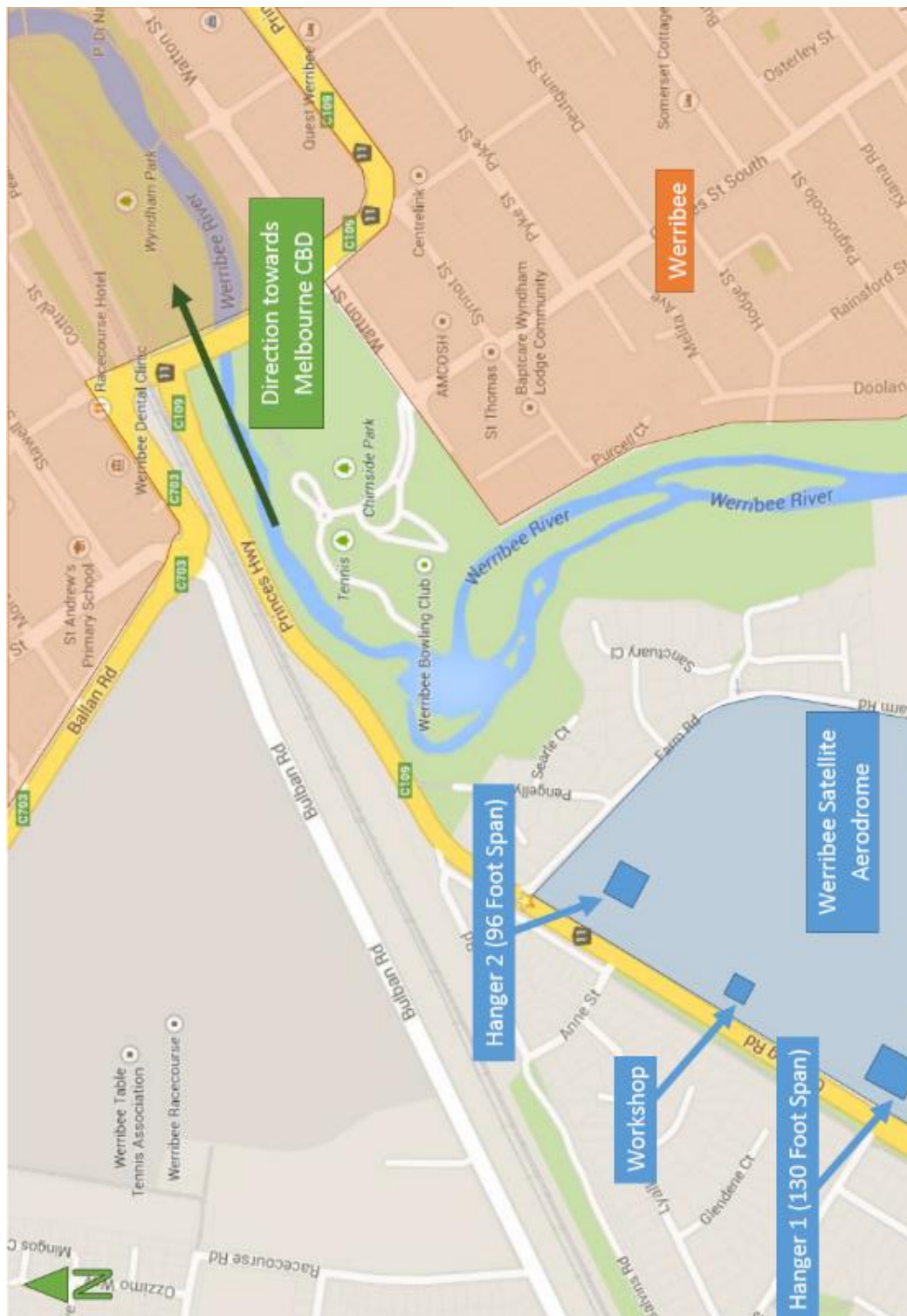


Figure 2: Map of the location in relation to the surrounding area
 Source: B-24 Liberator Memorial Restoration Australia Inc.



Figure 12: Air Photo of Werribee Satellite Aerodrome in 1942. Hangar No.1 can be seen about 30 mm to the left of the centre of the image. Hangar No.2 is near the top right hand corner of the image. Source: Google Maps.



Figure 13: Recent satellite image of Werribee Satellite Aerodrome. Hangar No.1 can be seen top centre of the image. Hangar No.2 is near the top right hand corner of the image. Source: Google Maps.

APPENDIX 3: Time Lines

Time line of important dates in relation to the Werribee Satellite Aerodrome

June, 1939	- Beginning of negotiations with MMBW Sewage Farm for land acquisition
February, 1940	- MMBW Approved scheme
July, 1940	- Federal Government acquired land
December, 1941	- America entered Second World War
1942 – 1943	- During period, all hangars at the Aerodrome were erected and the Aerodrome began operation
1952	- Land and buildings were returned to the MMBW
1952-	- Buildings were used as storage facilities for the MMBW
1989	- The B-24 Liberator Memorial Restoration Australia Inc was official founded as a non-profit association
1989-1995	- Site offered to the B-24 Liberator Memorial Restoration Australia Inc. to use Hangar 2 for its operations During this period, the hangar needed to be modified to strengthen the roof trusses.
1995- present (2014)	- Location being used by the B-24 Liberator Memorial Restoration Australia Inc.
Present – Future	- The B-24 Liberator Memorial Restoration Australia Inc. wishes to improve the site to provide a better experience for people visiting the museum.

APPENDIX 4: Structural Drawings²⁵

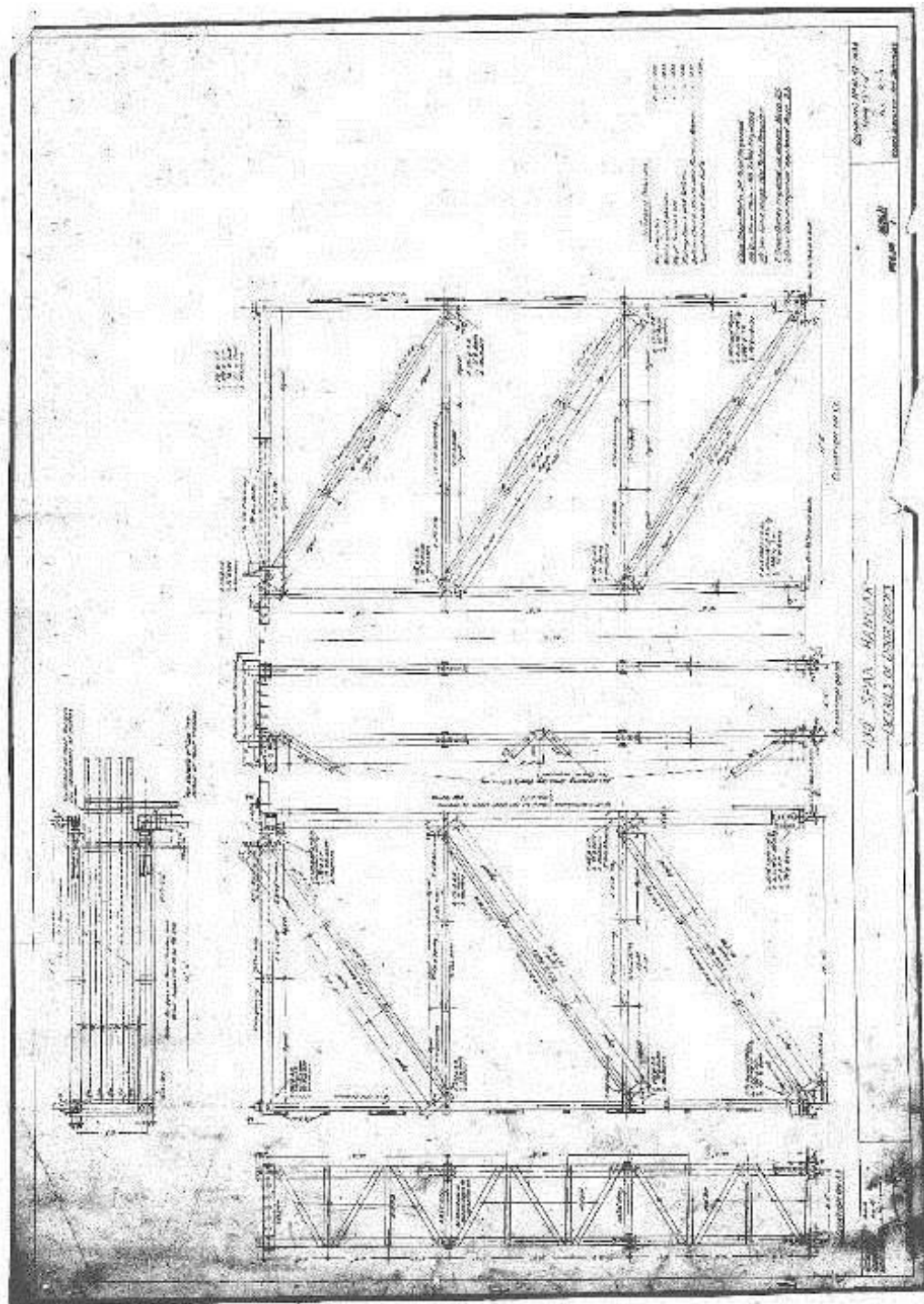


Figure 3: Detailed Drawing of the Door Docks for Hangar 1

²⁵ All drawings sourced from the archives of B-24 Liberator Memorial Restoration Australia Inc.

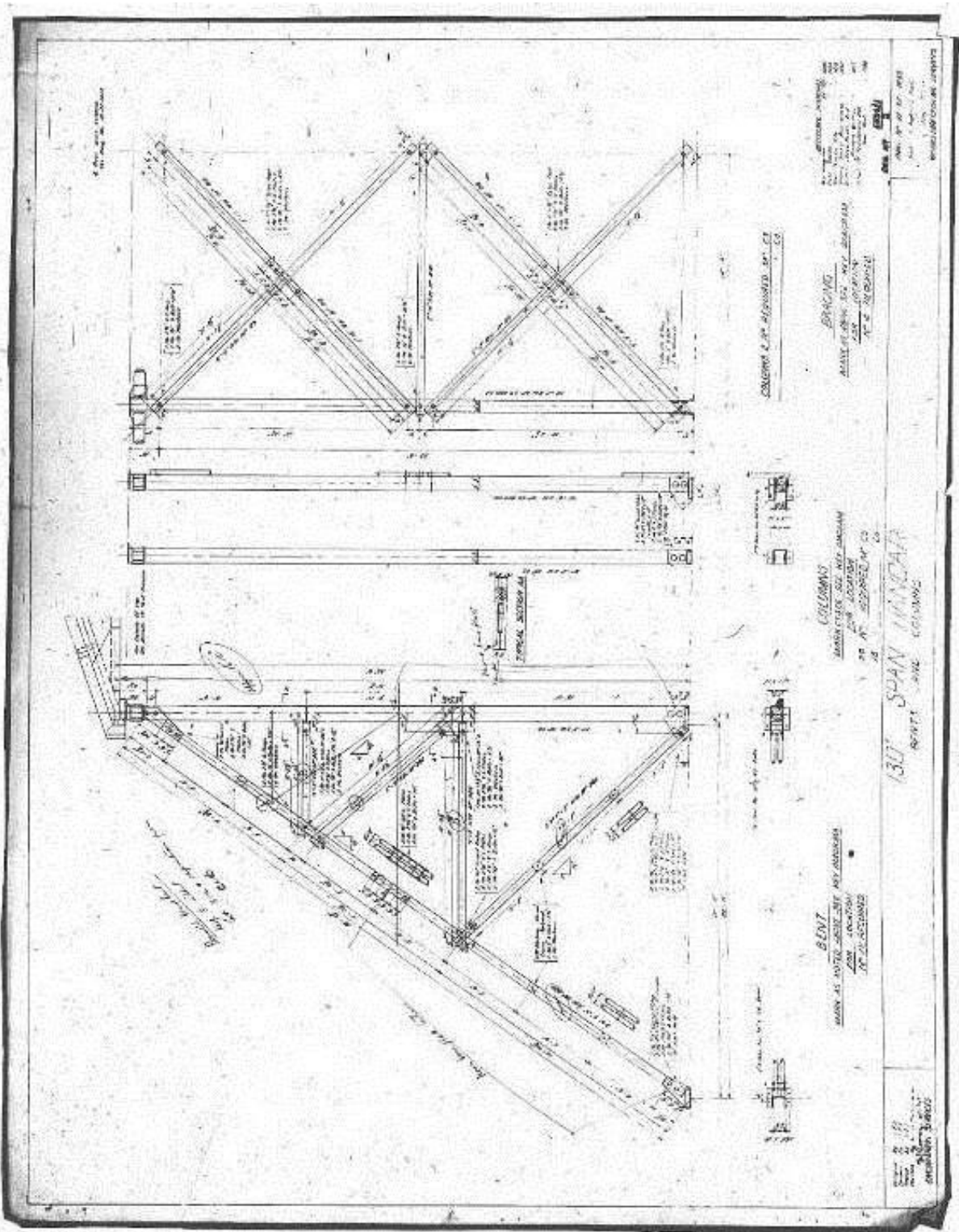


Figure 4: Detailed Drawing of the Columns for Hangar 1

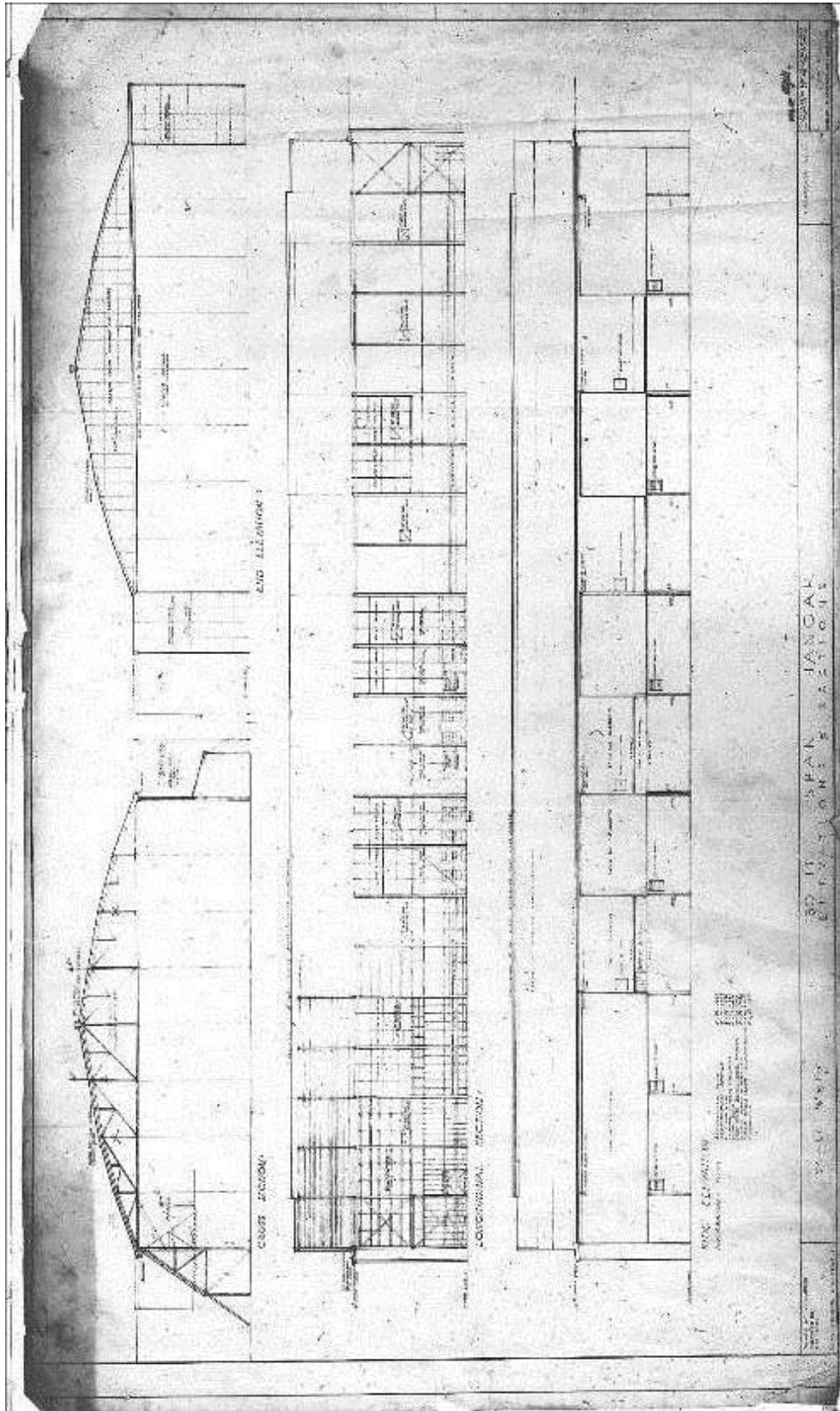


Figure 5: Detailed Drawing of the Elevation of Hangar 1

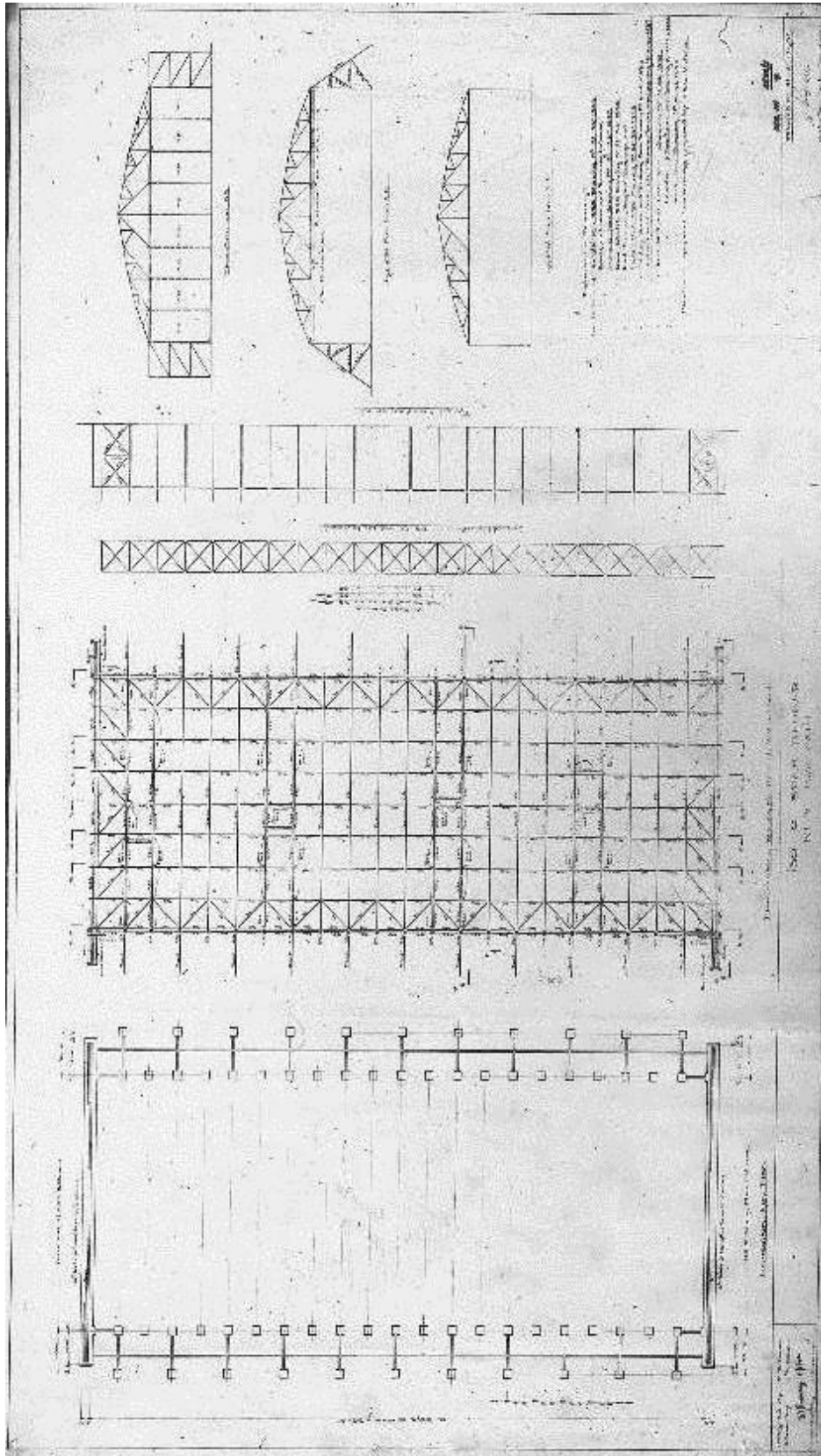


Figure 6: Detailed Drawing of the foundation and general layout for Hangar 1

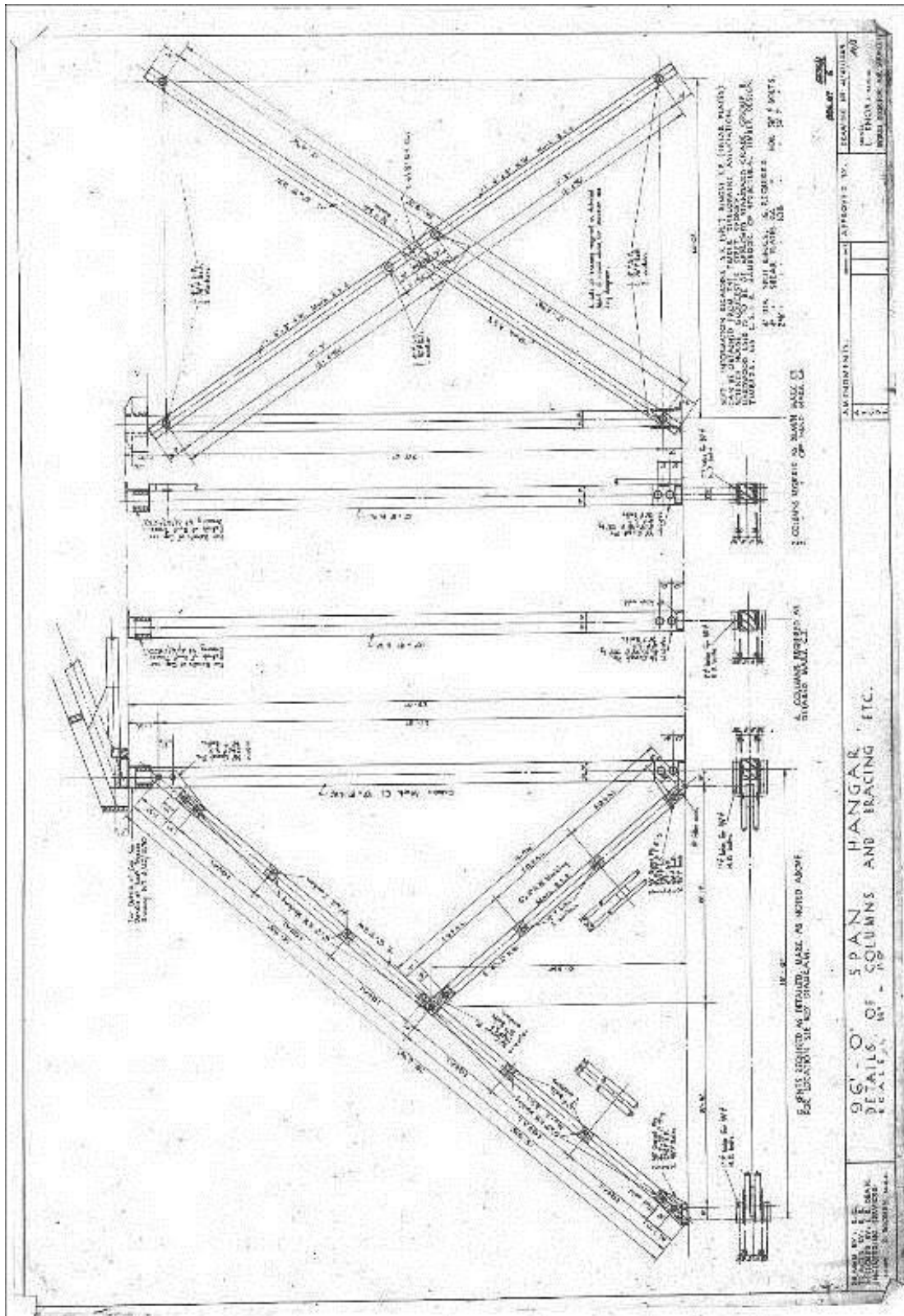


Figure 7: Detailed Drawing of the Columns for Hangar 2

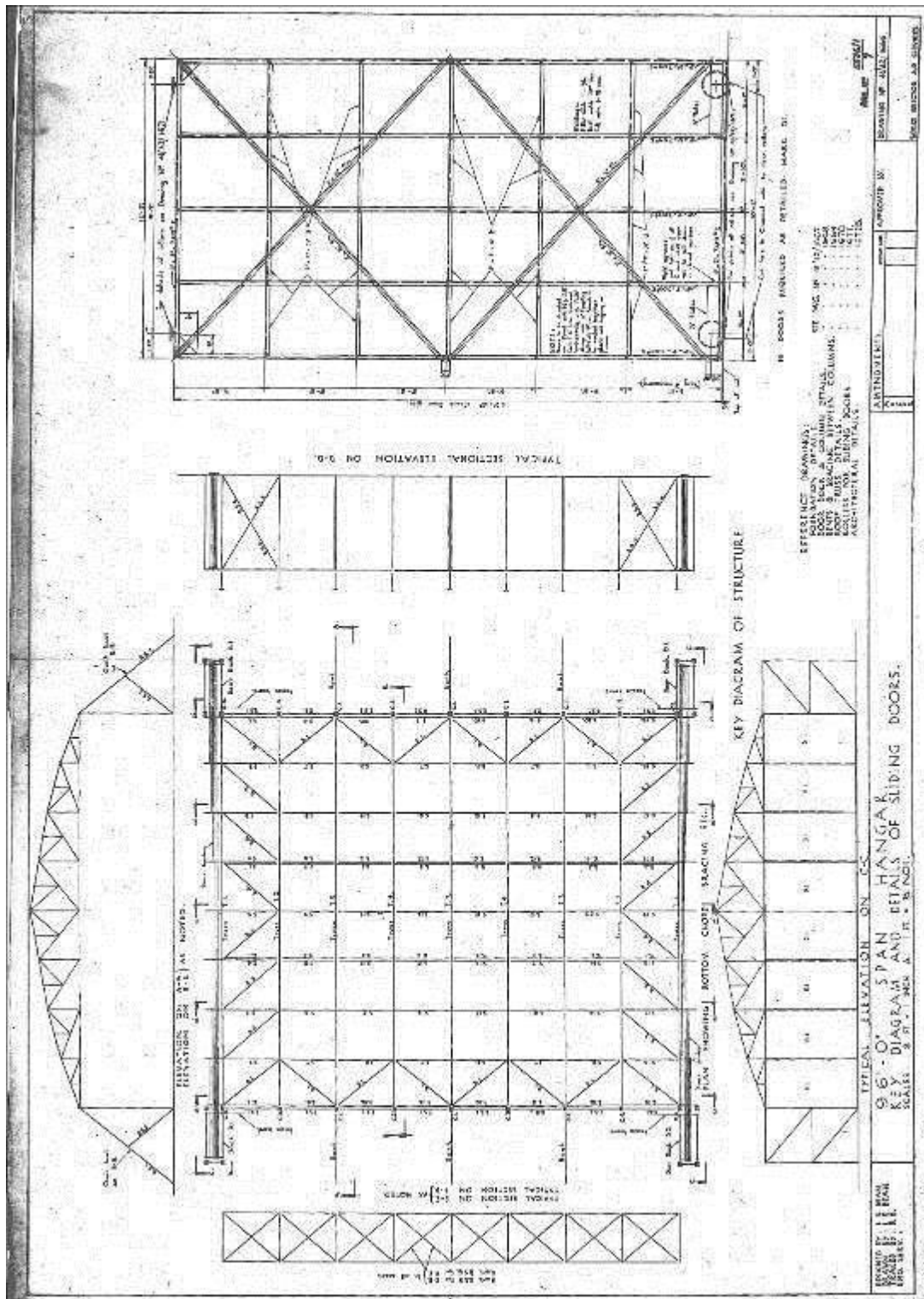


Figure 8: Key Diagram and Details of the Sliding Doors for Hangar 2

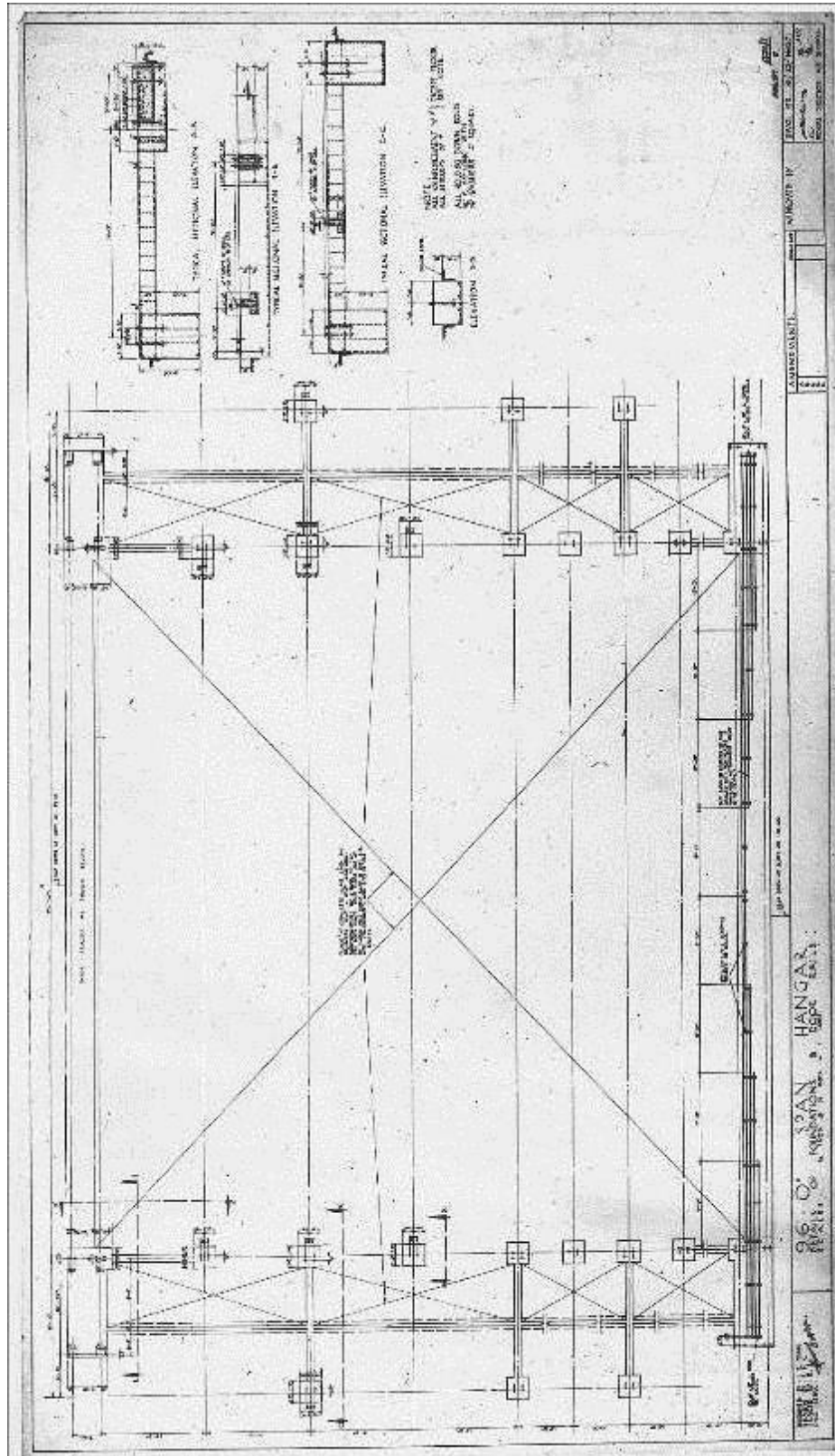


Figure 20: Detailed Drawing of the foundation for Hangar 2

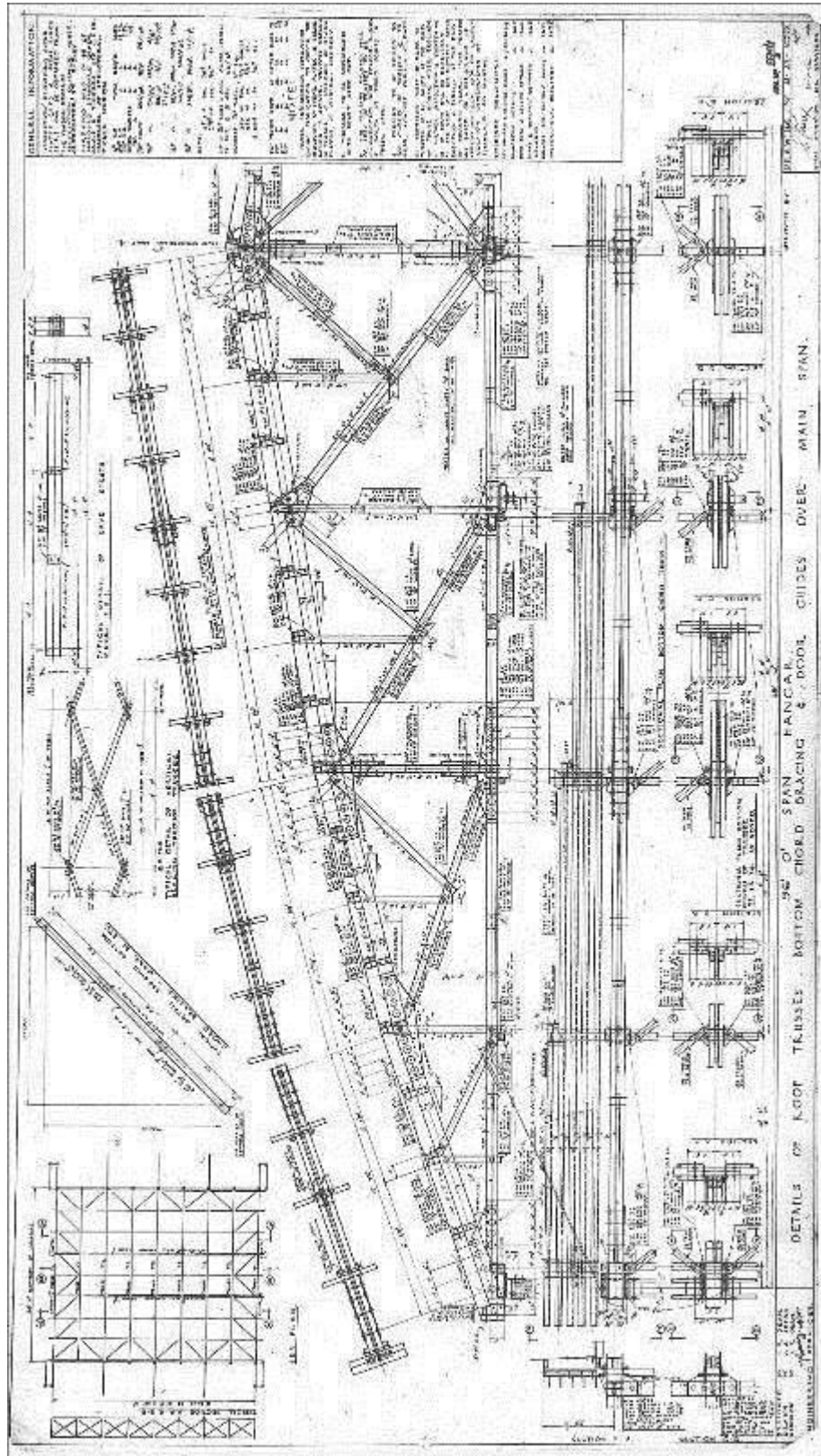


Figure 9: Detailed Drawing of the Roof Truss for Hangar 2

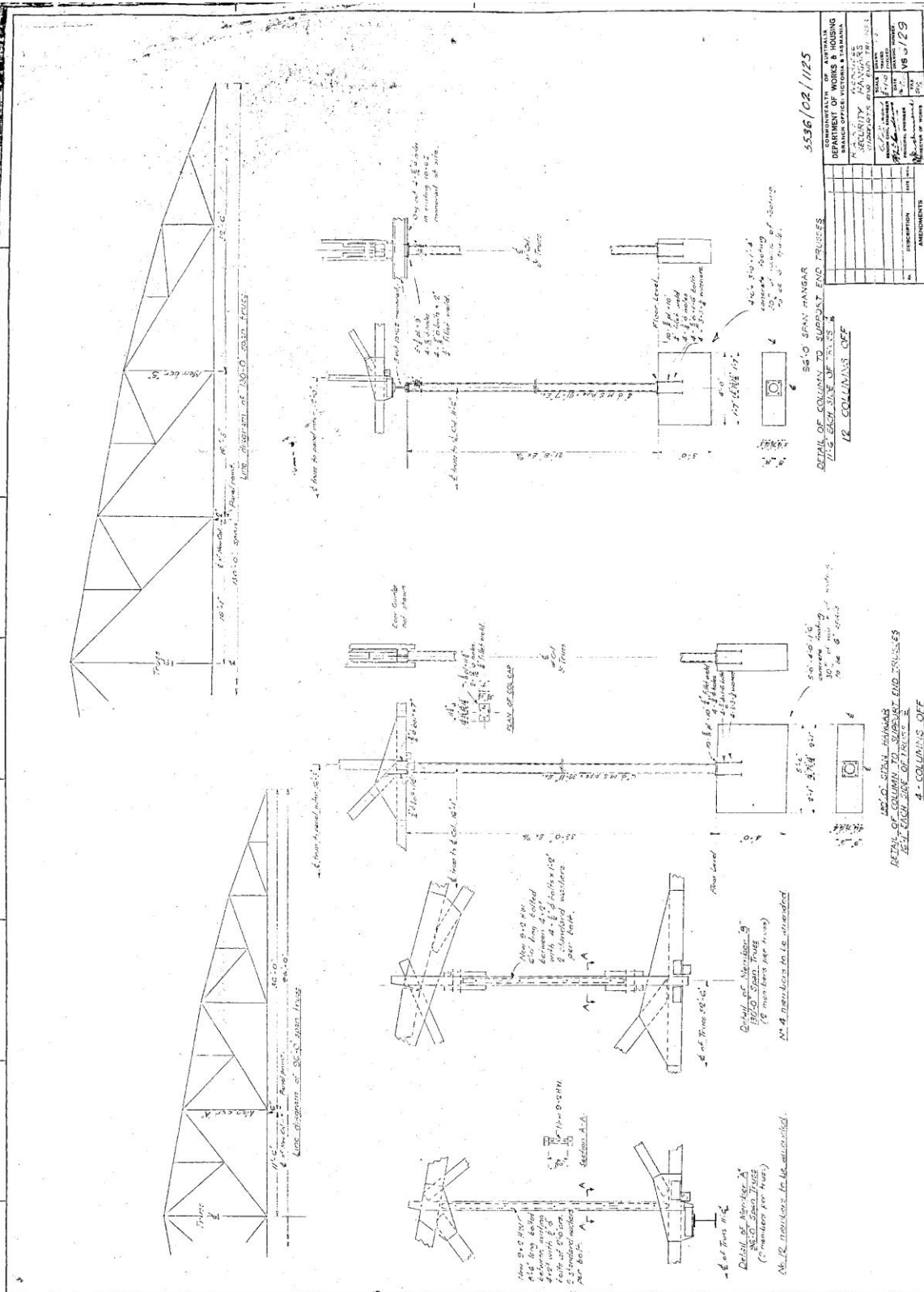
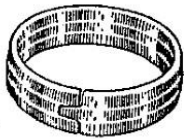


Figure 10: Detailed Drawing of the Column to Truss connections of the Hangars

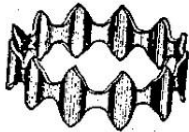
APPENDIX 5: TECO Fasteners ²⁶

The Timber Engineering Company (TECO) is a research affiliate of the National Lumber Manufacturers Association (NLMA). Some description of the Association is necessary to understand the development of the Timber Engineering Company. It is a federation of regional or species lumber manufacturing associations. Since its organisation in 1902 it has been concerned with problems and services universal in the lumber industry ²⁷.

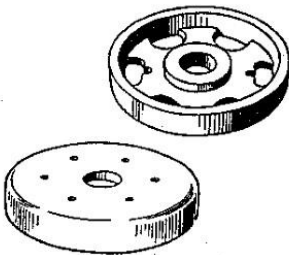
During the late 1920s an increasing interest in trade promotion was evident in the activities of the NLMA. This activity was finally identified as American Forest Products Industries (AFPI), Inc. Subsequently AFPI was established as a subsidiary corporation. AFPI was organized to carry on promotion work that related to all forest product industries rather than being limited to lumber. However, in the field of promoting lumber sales, one of the first efforts was the establishment of the Timber Engineering Company. TECO was to encourage the use of lumber in engineered construction, primarily through the development and sale of improved timber connectors. The Timber Engineering Company was incorporated in 1933 and purchased the patents for the split ring connector. Since then



Split Ring



Toothed Ring



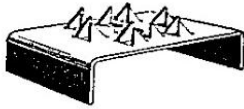
Shear Plates



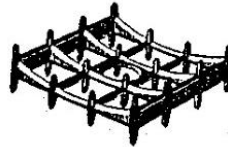
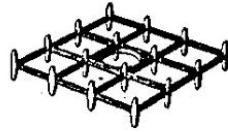
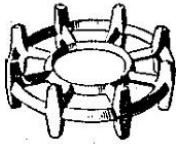
Clamping Plate

²⁶ These notes are a combination of "A Brief History Timber Engineering Company", 1958 and "Design Manual for TECO Timber Connectors", 1997, both of which appear in the references.

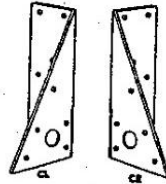
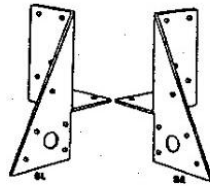
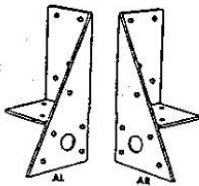
²⁷ These notes relate to organisations in the United States of America.



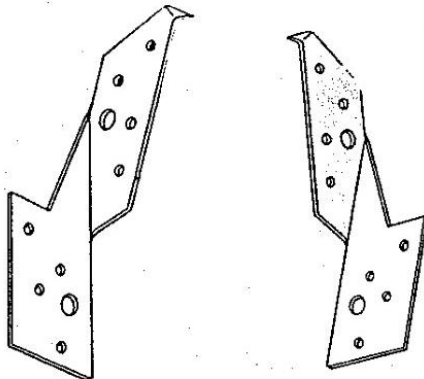
Bridge Tie Spacer



Spike Grids



Trip-L-Grips



Du-al-Clips

TECO has built up a whole family of special timber connectors, which each of the different connectors being shown above.

The type of TECO connections used in the hanger design was the Shear Plate Connectors. The Shear plate is intended primarily for wood-to-steel connections or for wood-to-wood connections in demountable structures when used in pairs. They are placed in pre-cut daps and are completely embedded in the timber when in position, being flush with surface of the timber. In some cases where field connections of pre-assembled sections are to take place, two shear plates used in place of split rings will enable the members to slide easily into position greatly reducing the labour required for the connection.

Shear plates are used to attach columns to footings through steel straps, in connections with steel gusset plates, for transferring loads from steel heel straps in bowstring trusses and for other steel-to-wood connections in timber structures. Their advantages as regards use in demountable structures lies in the fact that they may be installed in the respective members directly after fabrication and may be held in place by nails. There is no danger of their being lost. The lack of projections enables members to slide by one another without interference and since they are not repeatedly installed and removed,

there is no wear around the bolt hole or grooves. The following image is a drawing of the type of shear plate connector used in the Werribee hangars.

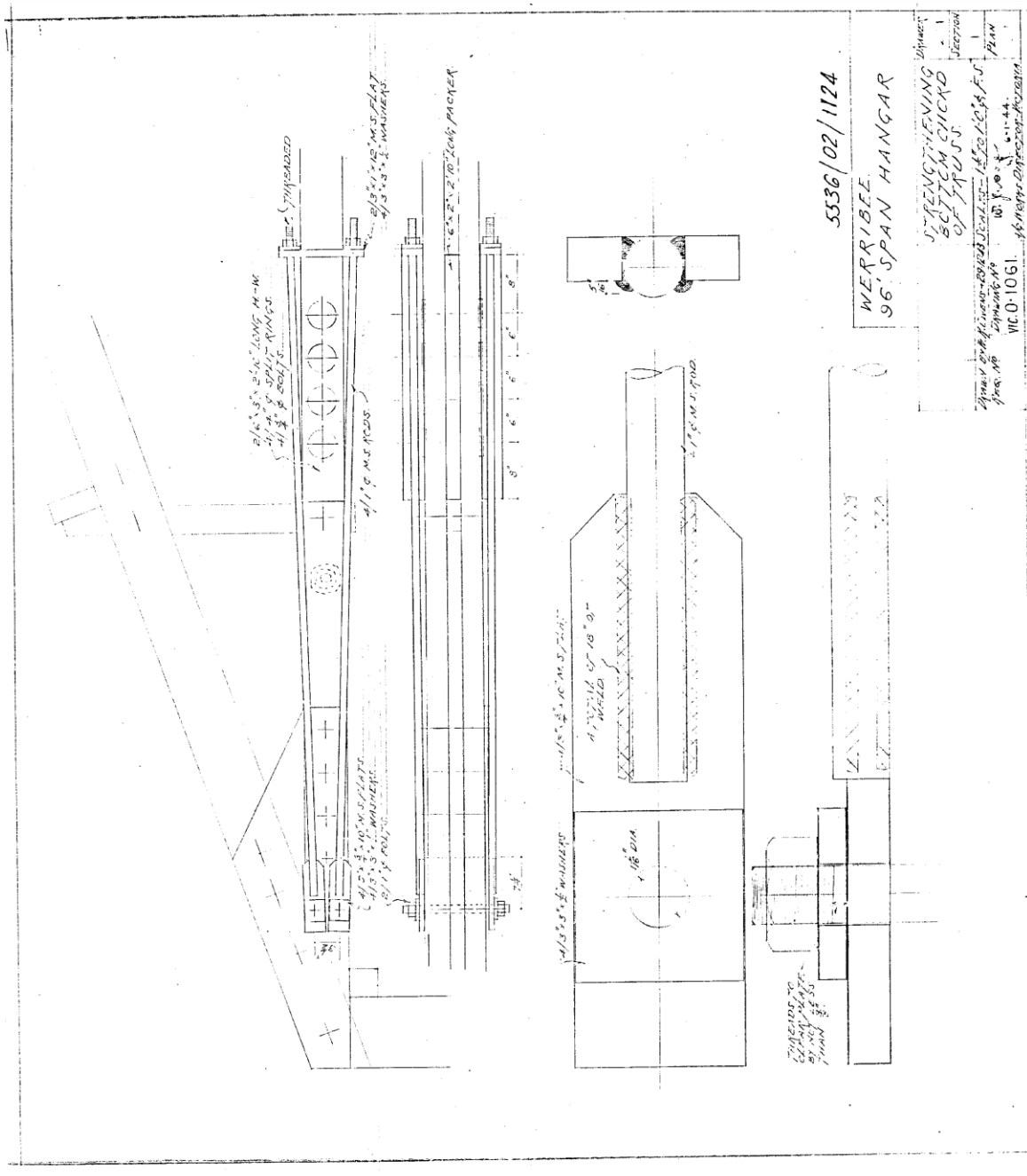


Figure 11: Detailed Drawing of the timber shear connections. This is the only drawing known to detail the shear connectors however it may relate to a repair implemented in 1944.²⁸

²⁸ Drawing sourced from the archives of B-24 Liberator Memorial Restoration Australia Inc.

APPENDIX 6: Individuals Associated with the Hangar Story

- Edward Theodore, Allied Works Council
- General George C Kenney, United States Army Air Forces

Biographies for these two individuals follow:

Theodore, Edward Granville (1884–1950)

by **Neville Cain**

This article was published in *Australian Dictionary of Biography, Volume 12, (MUP)*, 1990



Edward Granville Theodore
Source: *Painting by William Edwin Pidgeon, 1945*

Edward Granville Theodore (1884-1950), premier, Federal treasurer and company director, was born on 29 December 1884 at Port Adelaide, South Australia, second of six children of Basil Theodore, labourer, and his wife Annie, née Tanner, poor immigrants who had met on board ship. Basil, originally surnamed Teodorescu, was Rumanian; Annie, Liverpool-born, had an Irish mother and an English father. Working around the wharves and on the tugboats of Port Adelaide, Basil also cultivated a small, unrewarding orchard at Aldgate in the hills. Educated to the age of 12 at Lefevre Peninsula Catholic and Aldgate State schools, Edward found jobs as gardener, farm-hand and timber-getter, before heading in 1900 for Murchison on the Western Australian goldfields.

Moving east in 1903, he worked in South Australia then took employment—and an apprenticeship in labour politics—in the mines at Broken Hill, New South Wales. In 1906 he departed for the Chillagoe-Irvinebank hinterland of Cairns, Queensland, where, mixing mine labouring with prospecting for wolfram and tin, he perceived and set about repairing a lack of effective organization among the district's workers. With others he formed in 1907 the Amalgamated Workers Association of North Queensland, becoming at 22 its first secretary. Helped by **William McCormack**, who was to remain a close friend, he built the union into a broad-based and militant organization whose major achievements included the absorption of the sugar workers in 1910, victory in the sugar strike of 1911 and amalgamation in 1913 with the Australian Workers' Union, of which Theodore became State president. When he relinquished this post in 1916 his union career—marked by aggression, administrative cleverness, centralizing tendencies and clear-sighted pragmatism—came to a close.

Believing that workers' interests—conceived as improvement in job opportunities, wages and hours, and the exclusion of 'alien' labour—could not be served effectively by industrial action alone, Theodore had early affiliated the A.W.A. with the Labor Party, had subsequently thrown the resources of the A.W.U. behind that organization, and had embarked upon a political career. In October 1909 he won the Queensland Legislative Assembly seat of Woothakata (from 1912 Chillagoe) for Labor. On 20 December 1909 in St Stephen's Catholic Cathedral, Brisbane, he married Toowoomba-born Esther Mahoney, a contractor's daughter; while remaining privately ambivalent toward Catholicism, he would be well served in Queensland Labor politics by a resulting ambience of faith and domestic stability.

Theodore's rise was swift. In 1912, when **Tom Ryan** was elected leader of the parliamentary party, he became deputy leader and, on Labor taking office in June 1915, deputy premier, treasurer and secretary for public works. In October 1919, when Ryan resigned to enter Federal politics, Theodore became premier. Nearing 35, he cut an impressive figure. Wide-shouldered, deep-chested, thick-necked and almost six feet (183 cm) tall, he might have been a rugby front-rower. His hair was dark, his eyes piercing and set well apart, his face broad, with thick lips and a strong, cleft chin. Speech lessons, intensive use of the parliamentary library and careful attention to his appearance had transformed the somewhat untidy, anti-intellectual and ill-informed parvenu of 1909 into a politician of presence. Adroit in debate and knowledgeable in financial as well as industrial matters, he was already revealing a preference for the company of books to that of his political colleagues.

Among the dramatic episodes of his 'Queensland period' were the anti-conscription campaigns of 1916-17, the associated referenda and a conspiracy charge arising from attempts to avoid the censorship of Theodore's pamphlets—in all of which he and Ryan vigorously opposed Prime Minister **Billy Hughes**. Just as turbulent were Theodore's hard-nosed confrontations with strikers and radical elements in the labour

movement brought obstreperously to life by the divisions of war and events in Russia. Of more lasting interest was government intervention in the Queensland economy, embracing labour market regulation, business enterprises, and the level and structure of taxation. The philosophy of development—of 'opening up' Queensland's resources for closer settlement—was accommodated by railway, road and irrigation outlays, and by the creation or improvement of services (educative, marketing, financial) for the small farmer who was cosseted as the natural ally of the working man. In the labour market, union ideals were honoured by the Trade Unions (1915) and Industrial Arbitration (1916) Acts, and by legislation covering compensation, unemployment and workplace safety. Restriction of competition among workers was matched by an enthusiasm to promote it elsewhere: with the intention of curbing private monopoly while enhancing revenue, various state enterprises were established—cattle stations and butcher shops, timber and sugar mills, banking and insurance services, even an hotel. In other cases, such as the purchase of the Chillagoe and Mungana mines in 1918 and 1922, the maintenance of regional production and employment was a consideration. While Theodore's approach to the budget was orthodox, he sought—in keeping with emerging if contested principles of public finance—to meet mounting expenditure from taxation based upon 'ability to pay'.

Although there was (within the constraints imposed by war and post-war dislocation) a flurry of intervention under Ryan and Theodore, its novelty diminishes in comparison with the policies of other Labor—and even conservative—governments during the first quarter-century of Federation. The question of its effectiveness is complex, subject to intersecting political and economic considerations: politically, the strength of conservative resistance (in legislature, courts and the business community) which delayed or modified where it did not reject government initiatives; and economically, the degree to which policies as finally implemented were matched by their market outcomes. It is likely that historians will be impressed less by the intervention than by the vigour with which Theodore met opposition to it, by the brusqueness he displayed toward a laborite constituency unsettled by his stewardship, and by evidence that 'Red Ted' had himself begun to measure the gap between Labor idealism and the realities of a mixed and fluctuating economy.

Perhaps the most dramatic of several encounters between Theodore and the Queensland establishment began in 1920 with yet another rejection by the Legislative Council of a bill to increase pastoral rents. After appointing a complaisant lieutenant-governor ([William Lennon](#)), Theodore augmented Labor's numbers in the council in order to pass the legislation. He then set off for London to negotiate overseas borrowing which had been interrupted by war. A delegation of three under [Sir Robert Philp](#) representing pastoral and banking interests with English connexions preceded him, determined to compromise his dealings with the City. Theodore came away empty-handed and during 1921-22 was obliged to borrow more expensively in New York.

Meanwhile, a substantial reduction in Labor's majority after the 1920 State election led to such harassment in the assembly that Theodore resorted first to proxy-voting to circumvent Opposition 'misbehaviour' over pairs, and then to legislation to abolish the council which was passed in 1922. His 1921 Act governing the retirement age of judges would also change the composition of the Supreme Court. At the 1923 election Labor's parliamentary position improved, and early next year in London Theodore sought the conversion of loans due to mature in 1924-25. There followed a *rapprochement* which, despite Theodore's protest that he had yielded no more than a promise to freeze pastoral rents, drew strong criticism from radical laborites. Long unimpressed by his pragmatic, 'within system' approach to reform, they were now prepared to believe that a Labor government had succumbed to the English 'money power'.

That a man of the temper of Theodore should, during Federal A.L.P. conferences in the early 1920s, engage in bruising conflict with ideologues bent upon the destruction of capitalism is hardly surprising; indeed, he led the move to banish Communists from the party. The radicals, however, were able to exploit a misgiving among Labor supporters that Theodore's once ardent commitment to the party's economic objectives had weakened. The truth was that he had awakened to the potential for conflict between these objectives, especially in difficult times, and to the costs as well as the benefits of government intervention in economic life. There was also a matter of personal style: increasingly autocratic in his handling of government business and exuding a conviction that large affairs were best left in his keeping, Theodore resisted the unions with a no-nonsense frankness that aggravated their hurt. Incisively intelligent but lacking in urbanity, he evidently presumed that in politics logic should suffice, when too frequently it is not even necessary.

Pre-selected for the Federal seat of Herbert in July 1924, Theodore surrendered the premiership in February 1925 and in September resigned as member for Chillagoe to contest the Federal election. He had, in political terms, accomplished much in a relatively small State; and as an able, ambitious, young, yet immensely experienced politician who had come to see the advantages (for himself as for the party) of pursuing Labor policies from the centre, he could only have been tempted by an obvious weakness in the Federal leadership. But in November his bid for Herbert failed. While his subsequent decision to seek a seat in New South Wales was guided chiefly by the need for a more credible political base from which to challenge for leadership, it was strengthened by a realization that in Queensland his appeal had waned. Striving to extend his influence, he had agreed in late 1924 to adjudge a running dispute between the New South Wales executive and the A.W.U.—the notorious case of ballot-boxes with sliding-panels—and had found against [John Bailey](#), the A.W.U. official involved. During 1926 he spent time in Sydney broking among the party's factions. Such tactics, risky at any time, were especially so in the State where the wily manipulator [Jack Lang](#) had become premier in 1925.

Theodore's accession to the Federal seat of Dalley in January 1927, after the sitting Labor member obligingly withdrew, was clouded by his relationship with [John Wren](#) and by allegations of bribery which were made the subject of a Commonwealth royal commission. Although Theodore emerged formally unscathed, it was a 'characteristic beginning for [a] federal career in which his great ability, strength of will and capacity for resolute leadership, which the Labor Party so badly needed, were effectively neutralized by the association of his name with transactions of a questionable nature'. His parliamentary speeches, robustly eloquent rather than rhetorical, and directed mainly to economic matters, drew large and respectful audiences. He badgered the treasurer ([Sir](#)) [Earle Page](#) over financial policy, accused the government of a weakening commitment to tariff protection, and vehemently supported the unions—timber workers, coal miners and stevedores—in their militant defence of wages and hours. In this latter respect his performance smacked of opportunism, but in that of protection it rang with industrial patriotism.

By February 1928 Theodore had reached the Opposition front-bench, but in March, when [James Scullin](#) succeeded [Matthew Charlton](#) as leader, even the deputy leadership eluded him. At the November Federal election Labor's position improved, and in February 1929 he became deputy leader with an unenviable brief to mediate in the great industrial disputes of that time. When Prime Minister [Stanley \(Viscount\) Bruce](#) went to the people in October over the industrial issue, Labor won handsomely and Theodore became deputy prime minister and treasurer. As campaign director for New South Wales in both elections, he had displayed his usual industry and cleverness, though obliged to deal with a State executive from which Lang—decanted from government in 1927—was trying to isolate him.

Carefully attired, aloof, grave and measured in manner, the new treasurer stood out in a parliament where his air of brooding strength and confident grasp of the world at large intimidated colleague and foe alike. Incapable of small talk or *bonhomie*, and preferring to spend what little leisure he had in reading or fly-fishing, Theodore was a solitary man. In the comfortable library of his Kirribilli home were gathered works ranging from economics and history to philosophy and literature. Proud and relentlessly self-improving, already prospering from investments and multiplying his contacts in the business world, he had moved far in style and circumstance from the working man he once was; and the feelings he aroused in others—of admiration, of enmity, of simple envy—were, as ever, strong.

The 1929 Federal election coincided broadly with the onset of economic depression and political manoeuvring against Theodore from either side: in Queensland the conservative **Moore** government set up a royal commission into allegations of corruption over Mungana, and questions were asked in parliament about Theodore's Mt Isa shareholding; in New South Wales the Langites worked to ensure that Theodore would not supplant Lang in control of the State machine, and to extend their influence over local members of the Federal caucus.

Australia's Depression problem was formidable. How was a small, primary-producing, debtor country, which was determined to meet its international obligations, to deal with a massive external deficit inflicted by collapsing terms of trade and the abrupt cessation of capital inflow? Such were the character and severity of the crisis, and Australia's political circumstances in 1930-31, that little was possible by way of compensatory monetary and fiscal policy. Even had Theodore (rightly regarded as enlightened for his day) been able to implement reflationary measures, it remains an open question how much they might have achieved—the more especially in a world which was not behaving similarly.

Scullin inherited a hostile Senate, a deeply orthodox chairman of the Commonwealth Bank, **Sir Robert Gibson**, and an electorate resistant to novelty in economic policy. The suspension of assisted immigration and the sharp raising of tariffs in 1929-30 were characteristic Labor responses to mounting unemployment. These reactions, together with the countercyclical timing of public works financed in the normal way, were elements of Theodore's own thinking. So, too, was the manipulation of credit; but not, as some laborites were urging, by tinkering with the note issue or requiring the Commonwealth Bank to finance large capital projects when the loan market was quiescent. He offered, instead, his central reserve bank bill of April 1930, embracing the philosophy of price stabilization by monetary management which reformers like J. M. Keynes had been advocating in the 1920s when Theodore had read upon the subject. At this early stage, then, Theodore was of the liberal, rather than radical, monetary persuasion. Despite a wide sympathy for central banking ideas, the bill—at first delayed in committee and later rejected by the Senate—failed for political reasons. In April, too, the Mungana commission exposed McCormack's secret half-share in the mines before their sale to the Queensland government, and Lang finally secured control of the State executive, putting Theodore's pre-selection for Dalley at hazard.

Worse was to come. On 4 July the commission found Theodore and McCormack guilty of 'fraud and dishonesty' and abuse of ministerial position. The case against Theodore hinged upon McCormack's regular payment to him of sums equal to one-half of McCormack's receipts from the Mungana mines. On 5 July Theodore resigned from cabinet; on the 8th he vehemently defended himself in parliament. He also learned that the Queensland government intended to take civil action to retrieve the large difference between the price of the mines and their estimated worth. It was to be another year, however, before this action began.

For about four months, as the Depression deepened, Theodore absented himself from parliament and caucus, denying the Mungana charges, monitoring the policy debate and manoeuvring to recapture his position within the party. On 18 August Sir Otto Niemeyer, representing the Bank of England, delivered the chastening orthodox advice—vigorous cost cutting and swift budget balancing—which was to be embraced by Australian governments in the notorious 'Melbourne Agreement' of August. Scullin departed for London on the 25th, leaving **James Fenton** as acting prime minister and **Joseph Lyons** as acting treasurer to conduct policy in his absence. Making effective use of the Niemeyer bogey, Lang won the New South Wales election of 25 October. Apparently stung, Theodore returned to caucus as sponsor of the 'Gibbons resolution'. Its most striking feature was a proposal that the Commonwealth Bank should in effect cover the shortfall between government tax-loan revenues and planned expenditures (including domestic loan conversions and a public works programme of up to £20 million). The exchange rate was to be flexible and the price level was to be monitored. Now aligned with the laborites he had once rebuffed, he was thought to be preparing a challenge to Scullin. But, after Scullin's return in mid-January 1931, Theodore changed tack and supported Scullin's suggestion that Commonwealth Bank lending be directed more to the private than the government sector. A target for the price level—that of the later 1920s—was also set. At the caucus meeting of 26 January, despite opposition from Lyons and others on the right, Scullin restored Theodore to his former cabinet positions.

During the premiers' conference of February 1931 various under-treasurers aired severely deflationary ideas which lent urgency to Theodore's espousal of reflation. He approached the banks with proposals informed by a memorandum which Melbourne economists **Edward Dyason**, **Lyndhurst Falkiner Giblin** and **(Sir) Douglas Copland** had submitted to Lyons in September. In the course of the conference he and Scullin, accepting that a cut in real wages was unavoidable, pressed the advantages of achieving it within a policy which focused upon prices more than costs. Thus credit creation and exchange depreciation would ease the pressure upon money wages and deprive local bondholders of the bonus which a subsiding price level had brought them. A special tax would ensure that they shared in the reduction of living standards imposed by world events. If the banks co-operated in this scheme, governments would rein in their expenditures. Throughout these discussions Theodore drew upon Giblin in various ways and, when **Charles Wickens** fell ill, made Giblin acting statistician and effectively the government's official adviser.

As bargaining with the banks proceeded, Lang, with an eye on Federal office, declared that not only should local bondholders suffer (by a statutory reduction of interest rather than taxation), but that payments to British bondholders should be suspended altogether. By easing government budgets and the balance of payments, this course would have given more room for manoeuvre in economic policy, but it was condemned by the conference. Theodore's own scheme, presented now as a 'middle way' between repudiation and deflation, was rejected by the bankers who insisted upon fiscal discipline as the prerequisite to any assistance they might offer. He was accordingly impelled to his renowned 'fiduciary' expedient by which £18 million of unemployment relief works and farm assistance was to be financed by an expansion of the unbacked note-issue. As the fiduciary notes and associated bills went to their fate in the Senate, he persisted in a belief—buttressed by Keynesian and other authority—that reason was sufficient to the occasion. This same faith found expression in his abortive attempt to release gold for shipment on government account, not by modifying the note-issue reserve requirement, but by abolishing it altogether.

In February-March Lang's plan became the catalyst for an open split between the New South Wales and Federal executives. Federal caucus expelled the Langites who, with the defection of Lyons and his followers from the A.L.P., had the government at their mercy. Theodore, expelled with others from the

State A.L.P., was also rebuffed by his Dalley electoral council which endorsed the Lang solution. In early April Lang's defaults began, but were made good by the Federal government. In this month, too, Gibson delivered his 'ultimatum' on government finance which led to the establishment of the Copland committee to devise a scheme of deficit reduction. Its proposals, delivered to the premiers late in May, underpinned the deflationary Premiers' Plan of June.

The Plan was not as great a defeat for Theodore as commonly supposed. Its retrenchment programme was less severe than earlier proposals, and in an unprecedented Lang-like breach of contract, a statutory reduction of interest on internally held bonds was applied which—unlike contemporary wage cuts—would not be reversed as conditions improved. Moreover, during the protracted stand-off over budgetary policy, the Commonwealth Bank had been obliged to expand credit significantly. Believing that the rest of the world would soon reflate, Theodore was even able to comfort himself that the Plan itself had uses within a strategy of delay, or so he maintained to [John Curtin](#) in 1932. But his hopes of softening its impact with projects to relieve unemployment foundered upon banking intransigence.

On 22 July 1931 civil proceedings began over Mungana. A 'not guilty' verdict was handed down on 24 August, yet Theodore's failure to testify before either the commission or the court left his enemies with ammunition. In the electoral débâcle of December precipitated by the [Jack Beasley](#) group, Theodore was Labor's most conspicuous casualty: opposed by a Langite, he saw his 78 per cent of Dalley's formal vote (1929) plummet to 20. Bitterly contemptuous of what he construed as the treachery of Lang and the banks, and the unintelligence of Labor's traditional constituency—'the fool workers'—he resisted importunings to return. The man whom conservative [\(Sir\) Bertram Stevens](#) described as 'the coolest, best and most experienced financial brain in the southern hemisphere' had abandoned politics for ever.

Theodore's subsequent career embraced publishing, gold-mining and wartime public service. In 1932 he was asked by the A.W.U. to report on the operations and prospects of its struggling newspaper, the *World*. Finding his recommendations for its rescue uncongenial, the union offered Theodore an option on the paper. With a youthful [\(Sir\) Frank Packer](#) and others, he formed a company which in November 1932 exercised the option. Subsequently the *Australian Women's Weekly* (1933), a revitalized *Daily Telegraph* (1936) and the *Sunday Telegraph* (1939) appeared; by World War II Consolidated Press Ltd, with Theodore as chairman of directors, was well launched upon its impressive career.

Meanwhile, the prospect of high returns, as well as the test of nerve and skill associated with gold, had lured him to Fiji. There, in partnership with Wren, Packer and P. F. Cody, Theodore backed his own judgement against an unfavourable survey which had rattled his colleagues, and triumphed. By July 1935 the syndicate had opened the Emperor, Loloma and Dolphin mines, of which the first two were later floated on the Melbourne stock exchange. Living near Suva as managing director of all three, Theodore involved himself in local matters and made fewer trips to Sydney. From 1937 he ranged farther afield, seeking gold in Borneo and then on Guadalcanal, Solomon Islands, which he left just before the Japanese invasion.

Mindful of his abilities, men from both sides of politics sought to draw him into the war effort. [\(Sir\) Percy Spender's](#) attempt in May 1940 was foiled by Country Party objections which led [\(Sir\) Robert Menzies](#) to remonstrate: 'Give up this deplorable habit of throwing stones at great men'. John Curtin later secured Theodore's appointment as Director General (February 1942–October 1944) of the Allied Works Council. As organizer of resources for war-related projects, he showed his usual force and skill, but his return to public service brought controversy. In September 1942, protesting political interference, he threatened resignation over clashes with his old antagonists Beasley and [Eddie Ward](#);

his secondment of Packer from the army to be his director of personnel attracted criticism; and his willingness to invoke punitive labour regulations did not endear him to the unions.

After World War II Theodore occupied himself with mining and newspaper business, and talked of settling in Fiji. In 1946 he was a delegate to the Imperial Press Conference in London. Aware of his serious heart condition, he carried on with increasing difficulty; after joining the board of Great Boulder Mines Ltd, he suffered a major heart attack in 1948. He resigned the chairmanship of Consolidated Press in January 1949 and made his last trip to Fiji. On 9 February 1950 at Edgecliff, Sydney, he died of hypertensive cardiovascular disease; after a state funeral he was buried in South Head cemetery. His wife, two sons and two daughters survived him. His estate in Victoria, New South Wales and Queensland alone was sworn for probate at £629,915. In a panegyric Archbishop (Sir) James Duhig traced the way in which Theodore's intellect, character and industry had overcome his lack of formal education, but spoke of how the envy of others had brought him down in public life.

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Citation details

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George Churchill Kenney **General, United States Air Force**

Courtesy of the United States Air Force:
Retired August 31, 1951, Died August 9, 1977



General George Churchill Kenney, USAAF
Source: Life Magazine, 1943

General George Churchill Kenney, during his service in the Southwest Pacific in World War II, proved to sceptics the tremendous value of Air Force tactical support of ground and naval forces, demonstrating the new technique of skip bombing, to the pain of the enemy.

Kenney was born in Yarmouth, Nova Scotia, in 1889. He attended Massachusetts Institute of Technology intermittently from 1907 to 1911. In June 1917, he enlisted as a flying cadet in the Signal Corps Aviation Section. He was commissioned a first lieutenant in December 1917 and was immediately sent to Advanced Flying Training School in France. Upon successful completion of the course, in February 1918, he was assigned to the 91st Aero Squadron. Kenney flew combat missions for 16 months and was credited with downing two enemy planes.

In March 1919, Kenney was promoted to captain and appointed commanding officer of the 91st Aero Squadron. He remained with the occupation forces in Germany after cessation of hostilities until June 1919 when he was sent to the United States and reassigned to the 8th Aero Squadron at McAllen, Texas.

In 1926, Kenney was sent to the Air Corps Tactical School at Langley Field, Va., completing the course in the middle of that year. He next attended the Command and General Staff College at Fort Leavenworth, Kan. Following his successful completion of the course, Kenney served in a variety of assignments. He was an instructor at the Tactical School at Langley Field; he made a survey of possible aerodrome locations in Puerto Rico and the Virgin Islands, selecting sites which are in use today; attended the Army War College in Washington, D.C., graduating in 1933.

In March of 1935, Kenney was promoted to lieutenant colonel, skipping over the grade of major.

Kenney's next assignment was as chief of production at Wright Field, Ohio, in 1939. In March 1940, he was promoted to colonel and sent to Paris as assistant attaché for air in France. Kenney observed tactical operations on the Franco-German front and studied technical developments made in military aircraft of both nations. As a result of his observations and recommendations, a number of improvements were made in United States military aircraft over a year prior to our entry into World War II.

Kenney was promoted to brigadier general in January 1941 and the following month to major general. He was assigned to the west coast as commanding general of the 4th Air Force, in March 1942 and in July was assigned as commanding general, Allied Air Forces in the Southwest Pacific, and commanding general, Fifth Air Force, joining General Douglas MacArthur as his top air officer. General Kenney was promoted to lieutenant general in October 1942.

General George C. Kenney directed the successful air war against the enemy in the Southwest Pacific during the long haul from Australia to the Philippines over a period of more than three years. In one of the classic engagements of the war, the Battle of the Bismarck Sea in early March 1943, Kenney planned and directed the attack of B-17 bombers which sank 16 Japanese vessels in a convoy, with but minor loss to participating U.S. aircraft. He was promoted to full general March 9, 1945.

After the war, in December 1945, General Kenney was assigned to the Military Staff Committee of the Joint Chiefs of Staff, and was sent to London for the duration of the United Nations Conference. He continued with the Military Staff after his return to the United States in March 1946. In April 1946, he

was designated commanding general of Strategic Air Command, with headquarters at Andrews Air Force Base, Maryland.

On October 15, 1948, General Kenney assumed the position of commander, Air University, where he remained until his retirement from the Air Force Aug. 31, 1951. General Kenney has continued to serve military affairs, and the nation, as president of the Air Force Association, in 1954, and as an official with national charities. He also has written several popular books.

General Kenney died in Miami, Florida, on August 9, 1977. He was buried with full military honours in Section 30 (Grave 398) of Arlington National Cemetery. His wife, Sarah Bell Elizabeth Kenney (1912-1970) is buried with him.

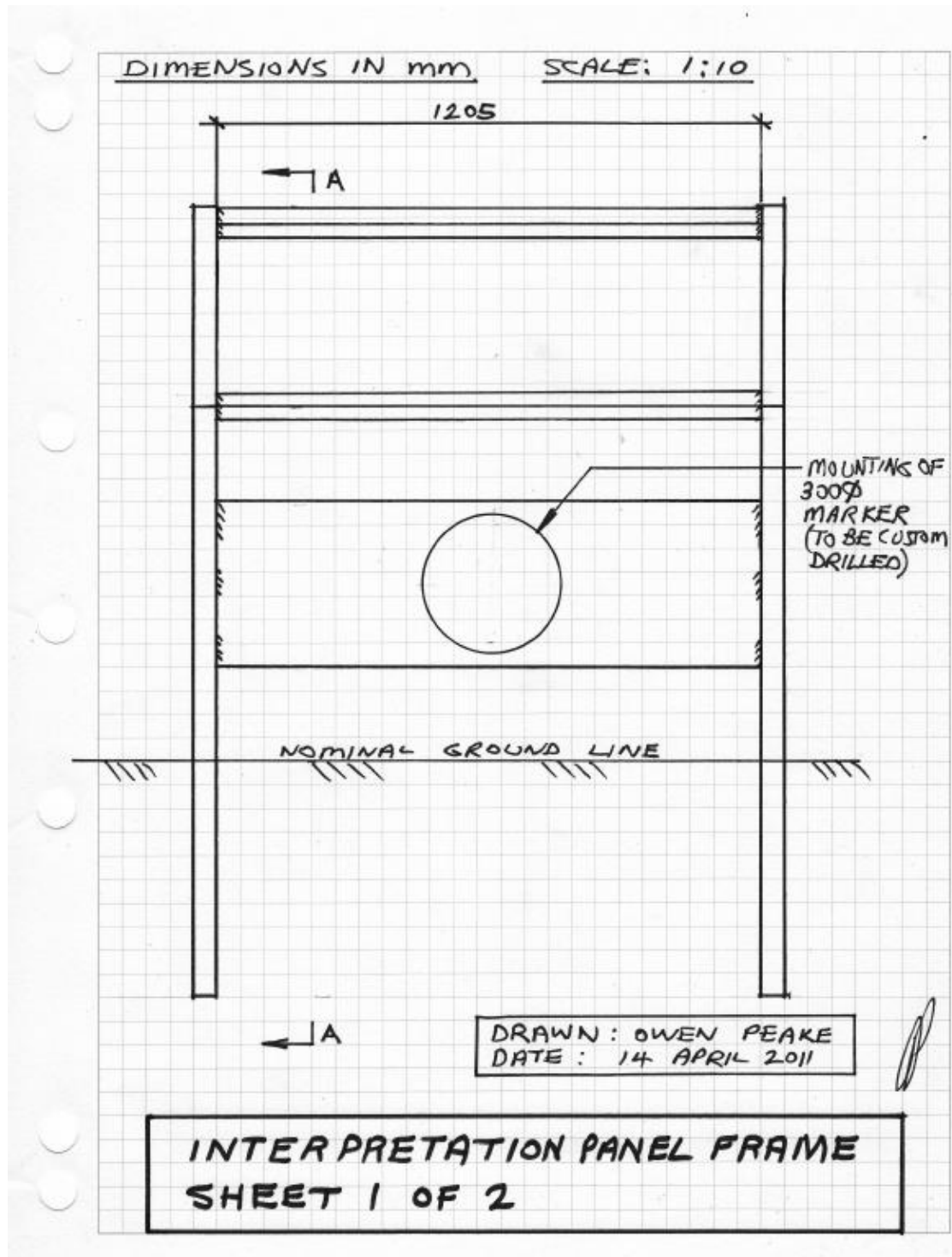
Arlington National Cemetery Website

<http://www.arlingtoncemetery.net/gckenney.htm>

U.S. Army • Arlington National Cemetery • Arlington, VA 22211, United States of America

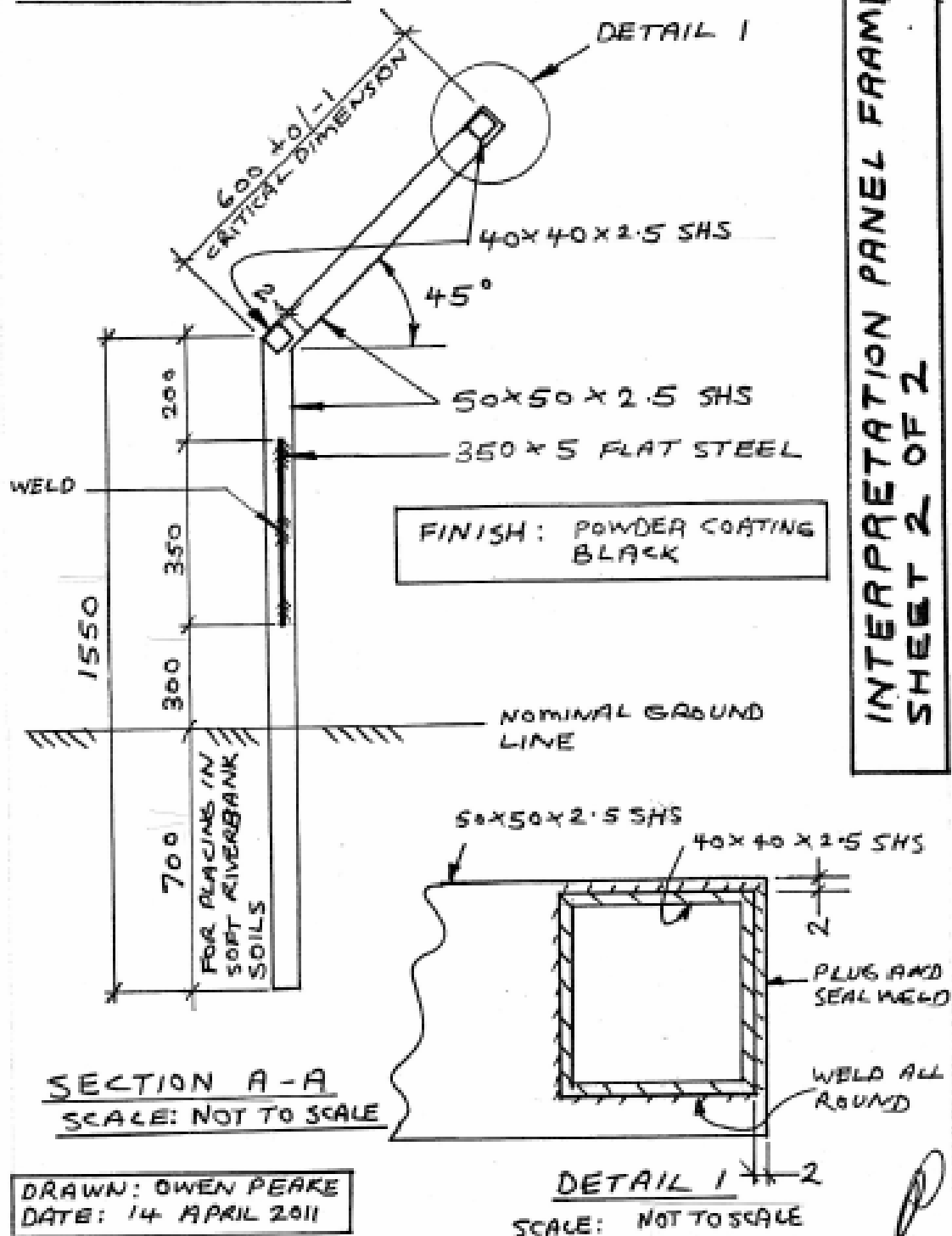
Downloaded 30 April 2014

APPENDIX 7: Drawings of Panel and Panel Mounting Frame



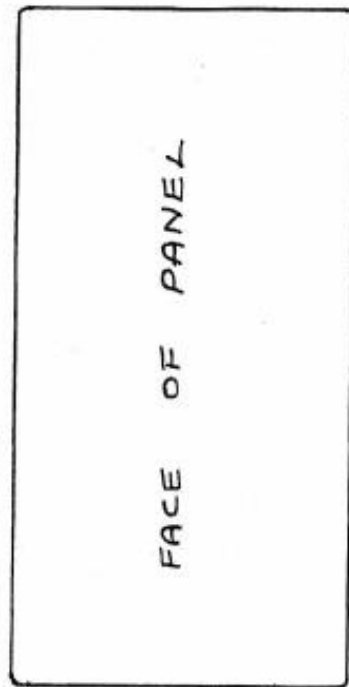
**FRANSFORD BRIDGE
MELBOURNE TO BENDIGO & ECHUCA RAILWAY**

DIMENSIONS IN MM

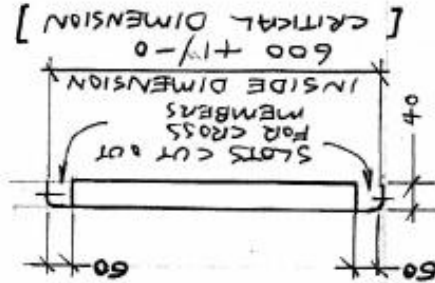
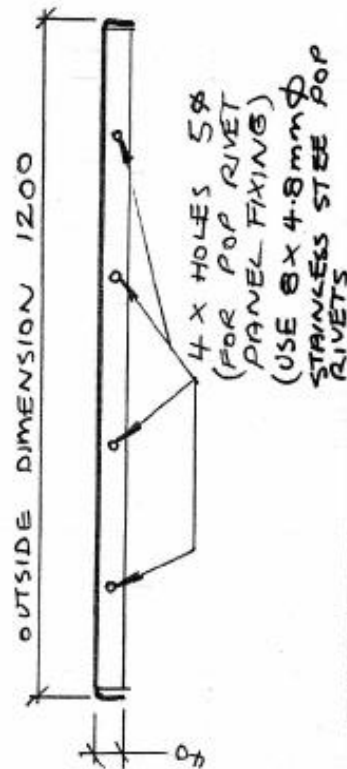


DIMENSIONS IN MM

SCALE: NOT TO SCALE



RADIUS OF
FOLD DOWN
NOT MORE
THAN 5mm
ALL ROUND



NOTES:

- 1) EDGES FOLDED DOWN ALL ROUND 40 mm
- 2) TWO PANEL TYPES:
 TYPE A: WITREOUS ENAMEL ON STEEL SCREEN PRINTED
 TYPE B: REFLECTIVE VINYL FILM WITH UV LAMINATE ON ALUMINIUM SHEET

DRAWN: OWEN PEAKE
DATE: 14 APRIL 2011

REVISED
9/9/2012

INTERPRETATION PANEL

FRANSFORD BRIDGE - TYPE A
MELBOURNE TO BENDIGO
AND ECHUCA RAILWAY - TYPE B

APPENDIX 8: Letter of Approval

Email from Judy Gilbert, Secretary, B-24 Liberator Memorial Restoration Australia Inc.

From: Judy Gilbert <judithone@optusnet.com.au>
Date: Wednesday, 19 February 2014 3:33 PM
To: owen.peake@bigpond.com
Subject: B-24 LIBERATOR AND WERRIBEE HANGAR HERITAGE RECOGNITION CEREMONY

Hi Owen,

Received your letter re the Heritage Recognition Ceremony. We would be pleased to hold the ceremony at the hangar on 13th July & to help where required. We'll be able to work around the fact that the hangar is open for visitors on Sundays.

We are in the process of spending money we received in a grant to put story boards around the hangar. If possible we would like your interpretation boards to be similar in design so the overall "look" is uniform.

If you like I can send you pictures of our boards so you can check the design/colouring.

Will understand if this is not possible from your point of view.

Regards

Judy Gilbert (Secretary)

CHANGE CONTROL

VERSION 1	6 FEB 2014		FIRST DRAFT
VERSION 2	9 FEB 2014		OP MARKED UP COMMENTS
VERSION 3	16 FEB 2014		OP MARKED UP COMMENTS
VERSION 4	16 FEB 2014		OP MARKED UP COMMENTS
VERSION 5	7 MAR 2014		DRAFT FOLLOWING V4 COMMENTS
VERSION 6	10 MAR 2014		OP MARKED UP COMMENTS
VERSION 7	26 APR 2014	6098 WORDS	DRAFT FOLLOWING V6 COMMENTS
VERSION 8	30 APR 2014	11304 WORDS	EDITING
VERSION 9	20 MAY 2014	11308 WORDS	PROOF READING INCORPORATED
VERSION 10	20 MAY 2014	11832 WORDS	EDITING